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# THE OIL WEEKLY

## OIL & GAS ENGINEERING

News Statistics

*March 4, 1932*

ADVERTISERS' INDEX, LAST PAGE

EDITORIAL INDEX, PAGE 5

# An Improved Counterbalance -- Perfected by Parkersburg

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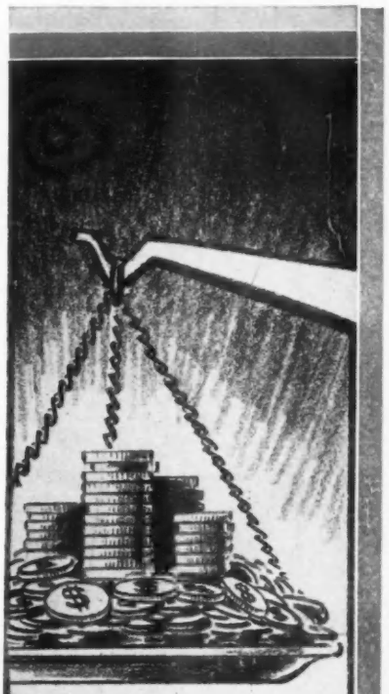

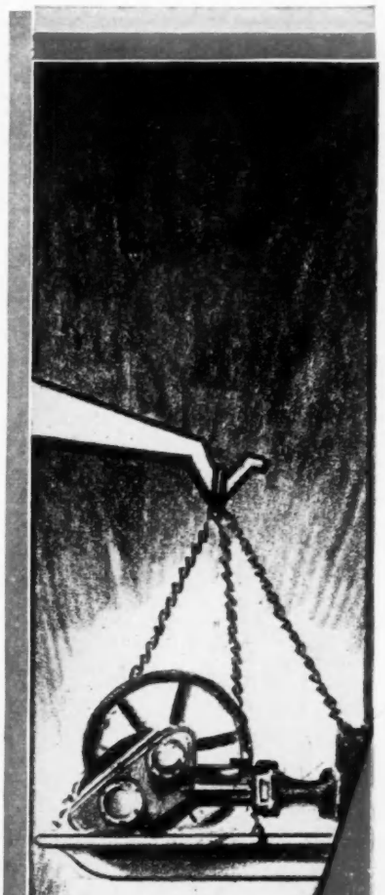

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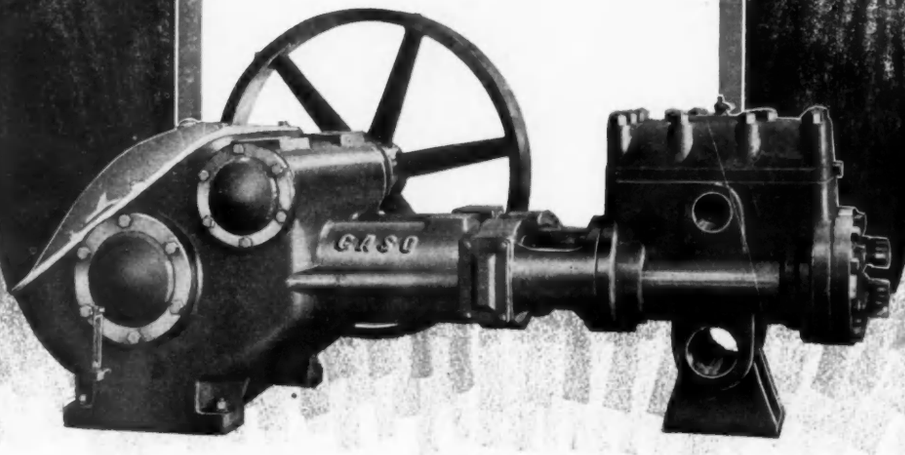


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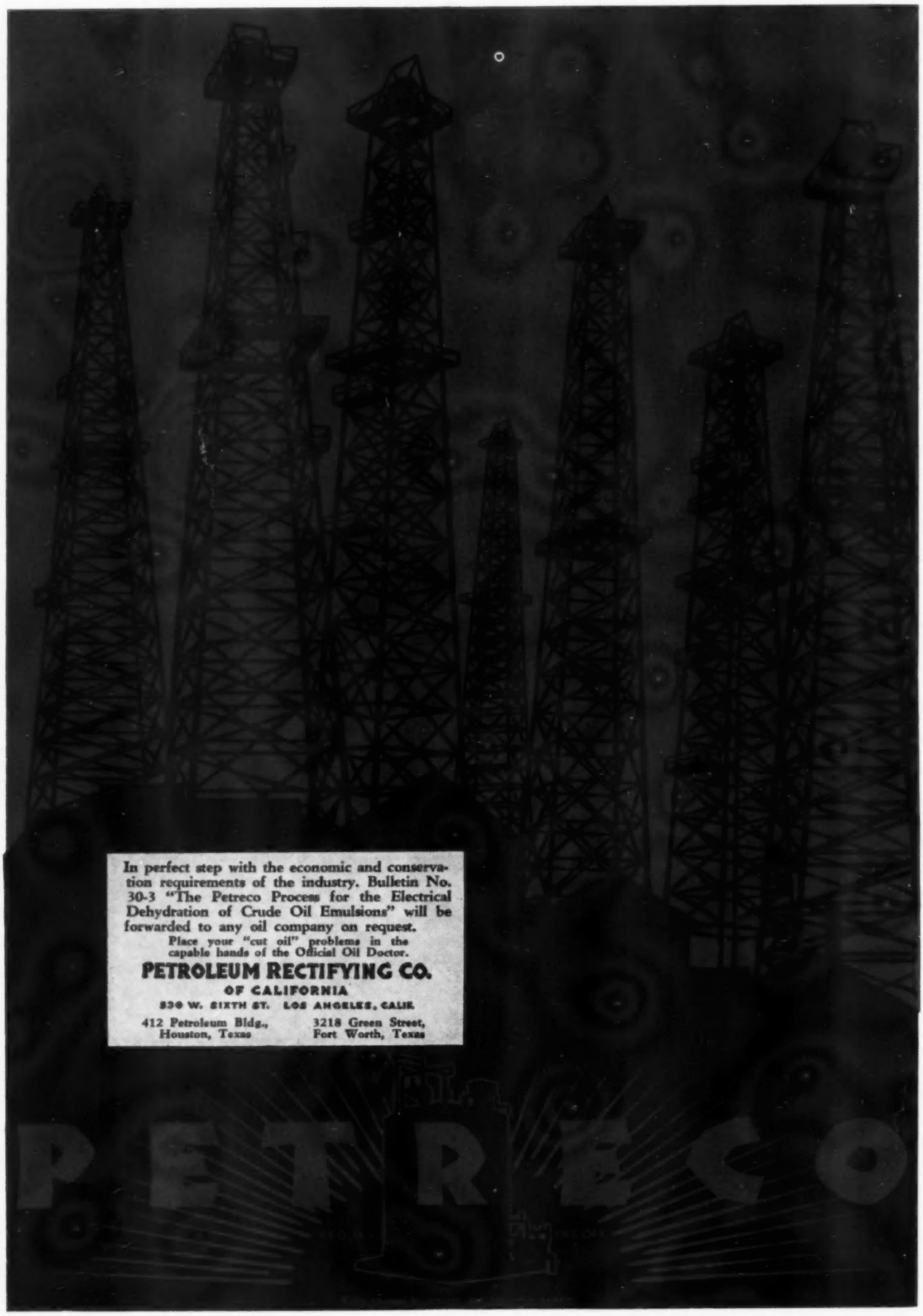
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*Editor*

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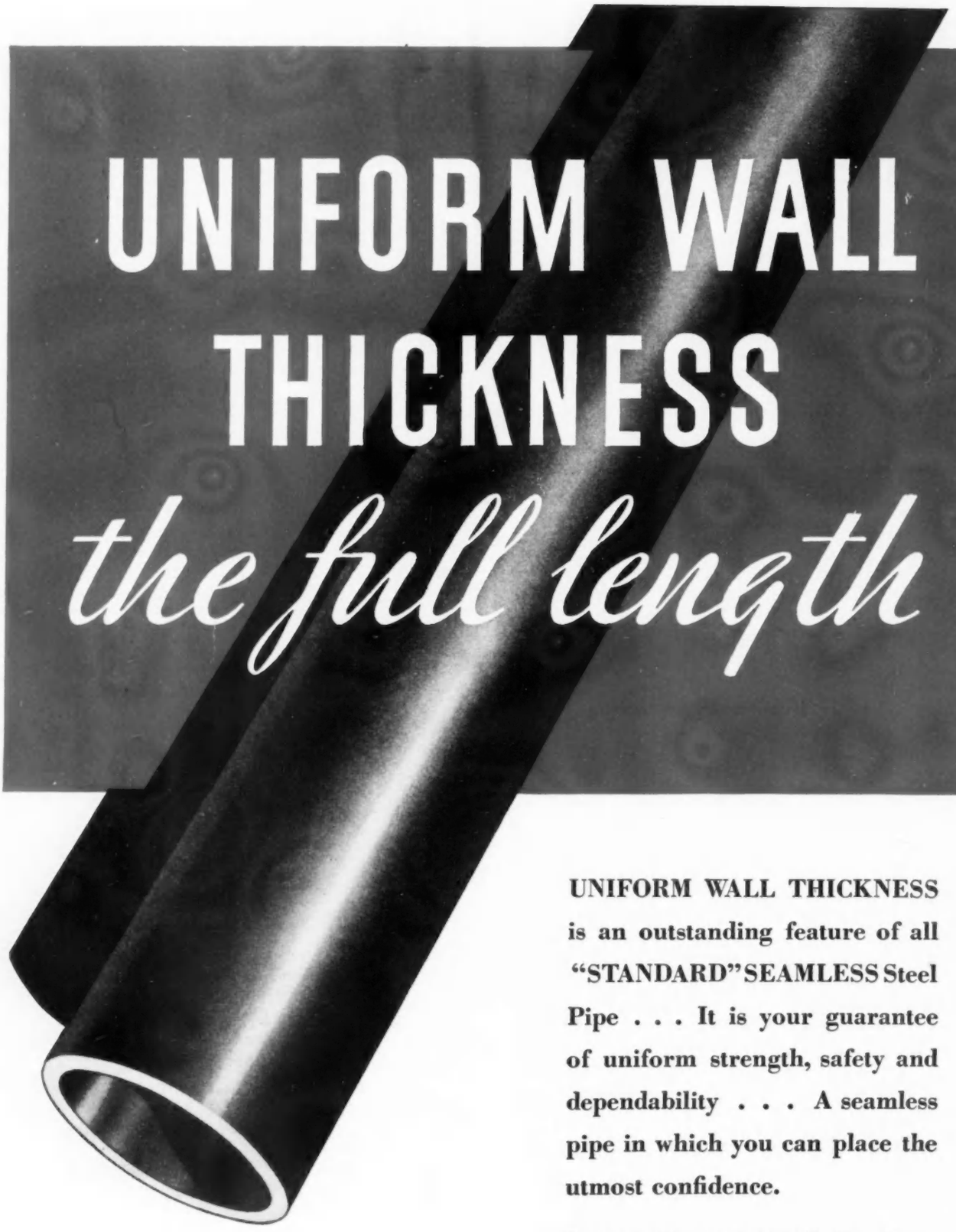

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VOLUME 64, No. 12 MARCH 4, 1932

# THE OIL WEEKLY

SPECIALIZED TO OIL AND GAS PRODUCTION
AND PIPE LINE DIVISIONS

ENGINEERING • NEWS • STATISTICS

# The Changing Panorama

Oil is indispensible in modern warfare, even in private war, and Japan and China are having difficulties keeping theirs private. A threatened move next is invocation by China of the League of Nation's covenant under which league members will restrain from all commerce and contact with nations which have been complained against as aggressive violators of the peace. China will, as a member of the league, complain against Japan, and thus, if the league is a working force, bring about Japan's ostracism. An important result would be placing Japan upon her own resources as regards oil supplies for her ships and fighting machinery. How far the Japanese have gone in anticipation of such contingency is their military secret, but it is probable that all oil supplies from outside would be cut off, despite the fact that the United States is not a member of the league.

## Flow of Gas

Report on a series of 60 tests in a study of the flow of air and gas through sands was among the subjects presented at the recent sessions of the American Institute of Mining and Metallurgical Engineers at New York. Previous study of this problem has been of limited scope, although there have been extensive investigation of the movements of liquids through such media. The report at New York was made by engineers of the United States Bureau of Mines, and is designed to verify and extend the data bearing upon the problems directly connected with the production of oil and gas. Page 19

Differences of opinion among well drillers as to the real purpose and proper functions of drilling muds have persisted since the inception of rotary drilling. Only during the last two or three years has this subject been given attention approaching scientific investigation, but rapid progress has been made in the study during that time. Petroleum engineers have attacked this problem with their usual thoroughnes and with co-operation of their companies that is characteristic of the industry's advancement in drilling practice. Enough work already has been done that many of the differences of opinion heretofore existing may be cleared up. Page 14

*Metropolitan area and vent lines; flow tanks and skyscrapers. The First National Bank and the Ramsey Tower as a background for oil field development as seen from the battery of tanks set at Anderson, Kerr & Continental Oil Company's well at 625 East Reno Avenue in Oklahoma City.*

The question of whether or not martial law proration of the East Texas field is valid was a step nearer solution Tuesday, March 1, when Dan Moody, former Texas governor, and E. F. Smith, attorneys for Governor Ross S. Sterling, asked the Supreme Court of the United States to set aside, pending action on an appeal, the temporary injunction recently placed in effect restraining the governor and his military aides from regulating properties of E. Constantin and J. D. Wrather.

Production in the United States again turned upward for the last week in February, recording an increase of 30,000 barrels daily. The increase came about through higher output in Texas and Oklahoma, the former to be expected because of more wells in East Texas producing at the established quota which was increased five barrels per well when the Sunday shut-down program was abolished. Local encouragement was in evidence however when California showed a decline of 8000, bringing the total below 500,000 barrels, but still far above the state's proration figure. Oklahoma output is indicated as being above market requirements, while Texas apparently could sell much more oil than is being produced. California still is adding to stocks rapidly.

Page 35.

**NOTICE**

**We are advised that a man who claims to be a representative of *The Oil Weekly* has recently been soliciting subscriptions to this publication in Oklahoma City. This is to advise that this publication has no subscription solicitors. Its circulation is all secured by mail. So please do not pay any money for subscription to *The Oil Weekly* to anyone claiming to be our agent.**

**THE OIL WEEKLY**

## Market Optimism

A spirit of optimism is appearing in the gasoline situation. Prices are expected to advance. This feeling is partly seasonal and partly based on the fact that present quotations are far below cost of refining with crude at present levels. Disposition of producers to hold production down and the present price, means only one thing for makers of gasoline to do. Page 37.

A prominent refinery sales manager once remarked that the trouble with the oil business was that refiners could not produce gasoline as cheaply as the sales department could sell it. It appears now that the salesmen can not sell as fast as refiners can make it. At any rate stocks of gasoline at refineries increased 1,775,000 barrels last week, despite a decrease in runs to stills. Increase of gasoline stocks to 45,567,000 barrels is seen as evidence of a decided slump in current consumption by motorists. Page 35.

Need for low cost crude for making gasoline to compete in the present market, using topping plants of slight efficiency and requiring a high cut in the fuel oil, is the reason for much of the unrest in East Texas.

Page 12.

### The Oil Man's Calendar

MARCH
- 7-8 *Committee D-2, Cleveland, Ohio.*
- 7-11 *American Society for Testing Materials, Cleveland, Ohio.*
- 10 *California Oil & Gas Association, Los Angeles (Annual Banquet).*
- 14-18 *American Chemical Society, New Orleans, Louisiana.*
- 15-17 *American Railway Association, Chicago, Illinois.*
- 23-25 *Michigan Oil Men's Association, Detroit, Michigan (Statler Hotel.)*
- 24-26 *American Association of Petroleum Geologists, Oklahoma City, Oklahoma.*
- 21-27 *Oil Equipment and Engineering Exposition, Los Angeles (Third Annual).*
- 28- 1 *American Chemical Society, New Orleans, Louisiana.*
- 29 *Natural Gasoline Association of America, Ranger, Texas (plant operators.)*

APRIL
- 4-9 *Western Petroleum Refiners Association, Excelsior Springs, Missouri.*
- 2-10 *National Aircraft Show, Detroit, Michigan.*
- 6-8 *American Gas Association, Birmingham, Alabama (Distribution Committee, Technical Section.)*
- 11-16 *American Oil Burner Association, Boston, Mass. (Ninth Annual).*
- 14-15 *Southwestern District A.P.I. Division of Production, Tyler, Texas (Spring Meeting).*
- 21-22 *National Petroleum Association, Cleveland, Ohio (Semi-Annual).*
- 22-24 *Petroleum Industry Electrical Association, Dallas, Texas (Baker Hotel).*
- 26-28 *Southwestern Gas Measurement Short Course, Norman, Oklahoma.*
- 27-29 *National Pipe and Supplies Association, White Sulphur Springs, W. Va.*

MAY
- 4- 6 *National Foreign Trade Council, Honolulu, Hawaii.*
- 9-11 *Natural Gas Department, American Gas Association, Tulsa, Oklahoma.*
- 9-13 *National Fire Protection Association, Atlantic City, N. J.*
- 17-19 *Natural Gasoline Association of America, Tulsa, Oklahoma (Mayo Hotel).*

JUNE
- 1- 3 *American Petroleum Institute (Mid-Year Divisional Meetings), Tulsa, Oklahoma (Mayo Hotel).*
- 6- 9 *National Association of Purchasing Agents, Detroit, Michigan.*
- 20-24 *American Society for Testing Materials, Atlantic City, N. J.*

SEPTEMBER
- 14-16 *National Petroleum Association, Atlantic City, N. J. (Annual).*

NOVEMBER
- 15-17 *American Petroleum Institute, Houston, Texas (Annual).*

# Can the League of Nations Stop Japan's Oil Supply?

By ROY E. LEIGH
*Associate Editor*

IT has been said that the withholding of petroleum by neutral oil-producing nations might stop the conflagration now raging in the East more quickly than any other measures which could be applied. Technically, at least, the operation of Article XVI would forbid the export shipment to the covenant-breaking state of all goods and commodities, including arms, machinery, cotton, and other sinews of war; but it is of oil that a black-listed belligerent might first suffer a shortage.

All of the oil-producing nations of the world are members of the League of Nations except the United States, Russia, Ecuador, and Egypt. If the United States should act in concert with the league, and if league members should fulfill all of their duties under its covenant, including that which binds them to prevent "all . . . intercourse between the nationals of the covenant-breaking state and the nationals of any other state, whether a member of the league or not," then Japan, if so designated as the covenant-breaking state, would be restricted to the meager oil production of Japan, Formosa, Manchuria, and, perhaps, Saghalin, assuming that the Russian island possession would at once be seized.

Current daily averages of oil supplies which might be available to Japan in event of effective economic boycott may be estimated as follows:

| | | Barrels Per Day |
|---|---|---|
| **Crude Oil—** | | |
| Japan and Formosa | 5,025 | |
| Saghalin (Japanese enterprise) | 3,000 | 8,025 |
| Casinghead gasoline, Formosa | | 950 |
| Shale oil, Manchuria | | 1,340 |
| Total | | 10,315 |

Considering that the U. S. S. R. is not a member of the league and probably is not in position to deny Saghalin oil to the Japanese, particularly in view of the Japanese concession there, the production also of Saghalinneft probably would have to be allocated to Japan in her hour of need. The productive capacity of this Soviet oil trust is currently estimated at 9800 barrels per day. Thus it appears,—and no doubt Japanese general staff experts have made such calculations before this,—that Japan has a total of about 20,115 barrels per day of oil available or within reach of seizure. This output could probably be increased in event of emergency.

It is pertinent, however, to compare this total of oil available with the total of Japan's petroleum requirements, insofar as that total can be ascertained. Here the casual investigator runs into difficulty and learns that the wily Jap has been too smart for him. Purchases for the account of the Japanese government, army and navy are not made public; and are not included in statistics covering Japanese imports. Such data, presumably, are regarded as military secrets.

However, an estimate of Japanese non-military requirements can be compiled; and these requirements, in themselves, are found to be far in excess of the local supply. Calculations based on the following figures indicate that the non-military demand ranges between 33,600 and 41,132 barrels per day.

| | 1930 | 1931[1] |
|---|---|---|
| Japanese imports of petroleum | 13,063,427 | 11,241,500 |
| Domestic production | 1,950,000 | 1,990,000 |
| Indicated annual demand | 15,013,427 | 13,231,500 |
| Daily average demand | 41,132 | 36,250 |

| | 1930 |
|---|---|
| Total sales of petroleum products in Japan | 12,268,571 |
| Daily average sales | 33,612 |

[1]Figures for 1931 are composed in part of estimates covering concluding months.

Of course, unless and until the imposition of embargoes against Japan, as sought by China, the Japanese army and admiralty will be able to buy oil in the open market. Japenese military experts are known to be alert to their needs in oil; and the assumption is that Nipponese storage tanks at this moment are full to overflowing.

Japan makes her purchases of foreign oil largely in California and Borneo, with smaller imports from Peru, Saghalin, and Manchuria. The following record of American exports to Japan is of some interest in this connection:

| Year | Barrels |
|---|---|
| 1930 | 10,988,426 |
| 1931 | 10,900,638 |

The monthly record reveals a bit of an increase in Aug-

## News Item

**"CHINA will invoke Article 16 of the League of Nations Covenant at the special meeting of the League Assembly, which is to convene at Geneva on March 3."**

*General Chiang Tso-pin, Chairman of the Special (Chinese) Committee on Foreign Relations, as quoted in the New York Herald-Tribune, of February 25, 1932.*

**ARTICLE XVI.**

**Article XVI of the Covenant of the League of Nations reads in part as follows:**

**"Should any member of the league resort to war in disregard of its covenants, * * * it shall *ipso facto* be deemed to have committeed an act of war against all other members of the league which hereby undertake immediately to subject it to the severance of all trade or financial relations, the prohibition of all intercourse between their nationals and the nationals of the covenant-breaking state, and the prevention of all financial, commercial, or personal intercourse between the nationals of the covenant-breaking state and the nationals of any other state, whether a member of the league or not.**

**"The members of the league agree, further, that they will mutually support one another in the financial and economic measures which are taken under this article, * * *"**

ust, 1931, when, presumably, the Manchurian adventure was being planned; but, if any substantial increase in military and naval reserves was made at that time, the necessary purchases must have been made in Formosa (Taiwan), Borneo, Saghalin, Peru, or elsewhere.

It is notable that Japan has gained a small additional supply of oil—and of coal, iron and other minerals—with each territorial accretion. Formosa, wrested from China in an earlier war, is productive of gas and is regarded as an important potential source of deep oil production. Saghalin oil production, despite its geographical location on the Russian part of the island, is economically and politically of greater value to Japan than to the U. S. S. R.

Japanese interests are now prospecting for oil in Dutch East Borneo; but no production has resulted as yet.

Japan gained an additional supply of shale oil in the conquest of Manchuria. A combination coal- and shale-mining operation at Fushun, 22 miles east of Mukden, has a current oil output of approximately 1340 barrels per day; and this, of course, could be increased by the construction of additional retorts. The deposit is estimated to contain about 5,000,000,000 tons of shale containing about five per cent of oil by weight, or approximately 1,575,000,000 barrels of oil. Open-pit mining methods require the removal of the shale over-burden in order to reach the coal deposit, which is estimated to contain around 1,200,000,000 tons of bituminous coal in one seam. The shale stratum has an average thickness of 450 feet. About half the deposit lies at depths of less than 1000 feet. The Japanese navy fathered this enterprise, even before the conquest, at least to the extent of purchasing its entire fuel oil output.

It is difficult for an outsider to estimate how much the production of indigenous oil could be accelerated by Japan in event her imports should be shut off by economic boycott or by war. It may be that the wily Jap has never displayed his hole card with respect to oil. Certainly it would be unwise for a nation nursing military ambitions, and having a limited supply of petroleum, thus to reveal its maximum productive capacity in advance of military need. Furthermore, the cost of imported oil probably is less than that of domestic oil during peace time.

It has been suggested that the peace-time oil industry of Japan, which, to a certain extent, is subsidized by the government, may have been held in leash, up to now, to serve only as a laboratory for the training of Japanese technologists and personnel.

Japan has certain shallow oil sands which are believed to afford opportunity for the introduction of oil-mining methods as practiced at Pechelbronn, Wietze, and, latterly, at Volkenroda, in Alsace, Hanover, and Thuringia. It is known that a German engineer familiar with the methods which Germany employed at Pechelbronn during the World War has made a survey of the prospects for oil-mining in Japan. It would be very surprising if his report, plans, and suggestions are not on file in the Japanese general staff office.

### Possible Results of the Invocation of Article XVI

While not losing sight of the improbability of any hazardous or courageous action by the League of Nations, and of the fact that the United States is by no means committed to such a policy of boycott, we may yet permit ourselves to speculate upon the developments which might result if China should gain her point at Geneva.

It would thereupon become obligatory upon every member of the league to impose embargoes against Japan. As such embargoes would not be effective without the co-operation of the United States, it must, for the development of this proposition, be assumed that similar action would be taken by our own country. Russia, threatened from the east, might also decide to co-operate; but Russian action is not essential to the success of such a project of embargo, as the League of Nations might be expected to bottle up Russian oil by Naval blockade.[2] Such action also would dispose of Roumania as a source, although Roumanian exports to the covenant-breaking nation presumably would already have been stopped in accordance with Roumania's pledge under that document.

Current sources of Japanese petroleum imports were noted above, as also was the wording of Article XVI with reference to nationals of league members. Bataafsche Petroleum Maatschappij (and all related Royal Dutch-Shell subsidiaries), Anglo-Persian Oil Company, Ltd., (controlled by the British Government), Burmah Oil Company, Ltd., Nederlandsche Koloniale Petroleum Maatschappij (a subsidiary of the Standard Oil Company of New Jersey), and all other producers from whom Japan might buy oil outside the United States are nationals of member states. This means, if the covenant is kept, that no oil could be exported legally to Japan from Persia, Iraq, India, Assam, Burma, Sarawak, or any of the Dutch East Indian islands. Egypt, although not a member of the league, undoubtedly would do as directed by Great Britain.

Having considered the closing of all the oil outlets of Europe and Asia, let us now investigate similar possibilities in the Western Hemisphere. For such purpose, it must be assumed that the United States forthwith would declare an embargo on the export of oil and other goods and commodities to this theoretical disturber of the international peace. Canada, Mexico, Venezuela, Colombia, Peru, and Argentine are members of the league; and, thus, would be obligated to conform to its policy of embargo, if such a policy should actually be adopted. Exports from Trinidad, British West Indies, to a covenant-breaking nation would likewise be forbidden by Great Britain as a league member; and exports to the belligerent from Curacao and Aruba, Dutch West Indies, would be stopped by Holland, for the same reason. Only Ecuador would remain as privileged legally to export oil to an Oriental belligerent; and she, in fact, probably would not be permitted to do so, as such would be forbidden by the League of Nations.

### The Military Angle

Approaching the subject from the military angle, it becomes interestingly apparent that, with the exception of oil of American origin, a very large percentage of the world's commerce in oil moves through three small fortified bottle necks. The Suez Canal, the Strait of Gibraltar, and the Panama Canal would become extremely important in any scheme of naval blockade or international warfare involving control of military and naval fuel. Assuming the co-operation of the United States to the extent of the imposition of an embargo on oil consigned to the covenant-breaking nation, it might be possible for one or two strong navies of nations belonging to the League of Nations to blockade those bottle necks and a few other oil ports and thus to shut off all except domestic sources of supply to the belligerent. With action by the league as purporting to establish a basis in international law, and with the consent of the United States as the only strong naval power outside the league, it might be possible with a very few battle ships to bottle up the oil sources of the world.

(*Continued on page* 42)

[2]Russian oil might, conceivably, in event of friendship or lack of hostility between the Union and the Empire, be moved by rail across Siberia in such a volume as to supplement Japan's supply from domestic and Manchurian sources; but the cost would be very great. A fuller development of the deposits of Saghalin might be expected to occur, instead, in event of an alliance between the Soviets and the Mikado, or in event of the conquest of Russian Saghalin by Japan.

# Lowdown on Present East Texas Situation

## Stay of execution is refused Sterling, new injunctions sought, but field remains at 75 barrels per well a day

GOVERNOR R. S. Sterling could not be reached Tuesday night after telegraphic advices from Washington had stated that Judge Brandeis of the United States Supreme Court had refused former Governor Moody's plea for a stay of execution of the three-judge court order restraining the governor from interferring with East Texas oil production by means of martial law.

Former Governor Moody, one of Governor Sterling's attorneys, spent considerable time with Judge Brandeis presenting the position of the Texas governor in the matter of martial law and oil production in East Texas, and after the Supreme Court Justice had refused his plea, Moody announced that he was making every effort to push up for an early hearing the appeal taken by Governor Sterling and the other defendants, Adjutant General W. W. Sterling and General Jacob F. Wolters.

At the present time the governor is enjoined not only from interfering with martial law with the production of E. Constantin et al, original plaintiffs against the governor, but also the properties of the People's Petroleum Producers, Incorporated, a Louisiana corporation, which secured a temporary restraining order against martial law proration in federal court at Tyler Monday.

### Governor Absent

THE OIL WEEKLY desired to ask the governor if his original position—that of not removing martial law on properties uncovered by federal injunctions, would be adhered to, as it was thought that possibly failure to secure stay of execution might make a change in his plans. However, THE OIL WEEKLY was informed that the governor was "in transit" to Austin and would not reach that city until sometime the following day.

Attorneys for the governor had expressed a great deal of hope that they would secure a stay of execution, and the refusal of the stay came as a surprise to many.

However, the failure to secure the stay of execution does not mean the opening of East Texas wells at this time. It may not mean that they will ever be opened for a wide open flush flow. At the present time even those properties covered by the federal injunctions are being required to adhere to the proration rules of the *Texas Railroad Commission*, under the federal court order.

The ruling of the Texas Railroad Commission, or rather the Texas proration law, generally known as the "conservation law," which was passed at a special session last summer, is now under fire in the federal court at Tyler, through application for several injunctions to restrain the commission from enforcing its rules.

The important thing to the industry is the time element involved as well as the ultimate decision of the court. How long it will be before the matter of the legality of the railroad commission's orders will be tried in court is a question of interest to all. Despite the fact that several injunctions have been sought against the railroad commission's proration program, no such restraining order has been issued by the federal court.

The United States Supreme Court is now in session and will close its session early in May, not to meet again until in September. Attorney Moody will undoubtedly immediately present a written application for an advance hearing, giving his reasons as to why the case should be advanced over other cases now on the docket. The general practice of the Supreme Court is to give such a written application attention on the Monday following its filing. The court may either at that particular time or after deliberation advise the attorneys whether an advance hearing will be granted during present session. Because the time element is a most important one, it is thought possible that an advance hearing may be granted, but of course this is purely guess work, and guess work isn't indulged in on the Supreme Court! In the event advance hearing is not granted, the matter will not come up until next September, or thereafter. Until the Supreme Court has acted on the appeal of Governor Sterling, the situation in East Texas still depends upon two things—the number of injunctions granted against *martial law proration*, and what the federal court does to the applications for injunction against the Texas Railroad Commission's proration orders. Insofar as effect is concerned, the railroad commission's order and the governor's martial law orders are the same; and if the governor loses his fight, and the railroad commission wins its fight, then proration will remain in effect. But if both the governor and the railroad commission lose, then it is a case of how much oil the pipe lines and tank cars will move!

In the event that both of the state forces lose in federal court, it is possible that there will not be moved out the same large quantity of oil as was moved out under the disastrous three days "open flow" last August, when production went to more than a million barrels a day. Some of the major purchasing companies have entered into the picture with announcements of restricted purchasing policies which in effect mean that they will buy only certain amounts of oil—and in making these announcements let it be known that they intend prorating their own producing properties on a well basis and will restrict their purchases from outsiders proportionately. Whether such a policy could be maintained in the face of large tank car shipments out of East Texas remains to be seen.

From a standpoint of actual results, the field is now just as tightly under proration as it ever was, with an allowable of 75 barrels a day in effect and the prospect of the railroad commission-governor forces limiting the field's total production to 325,000 barrels a day under an allowance to become effective March 15.

# East Texas Proration Objectors Encouraged by Injunction

## Need for low priced crude by local refineries one reason for desire to open field; some big producers want oil

By H. H. KING
*Staff Representative*

TYLER, Texas.—Agitation that has accompanied court attacks on military rule and proration restrictions in the East Texas field by Eugene Constantin, J. D. Wrather and others has resulted in the anti-proration group gaining recruits, as evidenced by the fact that nine operating interests filed injunction petitions in federal district court here during the past week. Of this number only one had obtained a court order similar to that won by the above independents against Gov. R. S. Sterling, Adjt. Gen. W. W. Sterling and Brig. General Jacob F. Wolters. The Peoples Petroleum Producers, Inc., Shreveport, received a restraining order February 29 from Federal Judge Randolph Bryant of Sherman as a sequel to an injunction plea filed January 28. The latter concern filed a supplemental petition last week at Tyler naming members of the Texas Railroad Commission also as defendants, and also for $100,000 damages, but the court deferred taking action on the amended clauses. In the meantime the various properties involved in these suits are restricted to proration allowances through either the orders of the governor, or the commission, with the latter having jurisdiction over wells protected by injunctions.

Petitions for relief from proration by injunctions were filed in federal district court within the past week by the following companies and operators:

T. W. Murray, Overton, who operates under the name of M. & G. Oil Company;
Walter E. Cook and A. S. Parmer, Louisiana operators;
Imperator Oil Corporation (A. Andrade, III.), Dallas;
North Star Oil Corporation (E. E. Fogelson), Dallas;
Whittle-Kavenaugh (R. B. Whittle), Houston;
Bill & Dave Oil Company;
Lide-Rowe Oil Company; and
Lide-Taylor Oil Company.

The last three are of Henderson, Texas, and Shreveport, Louisiana.

In addition to the above property owners that have openly challenged the state authorities there are a few other operators that are remaining under cover and contributing financial assistance to carry the Constantin-Wrather case through the higher courts should the defendants fail to obtain a stay of execution of judgment rendered February 18 by a three-judge federal court, and appeal.

### Want No Type Proration

Proration in any form is objected to by the majority of the well owners seeking to remove the lid from the East Texas field. The basis of Constantin's attack is to obtain a bountiful supply of cheap crude for a skimming plant that he controls near Overton. He shares an interest in three producing wells in the field, including one each with the Elzey Drilling Company and Wade-Reynolds Syndicate. Supplying of low priced crude for two local refineries controlled by J. D. Wrather is the motive behind his attack on proration also, although he has a half dozen completed wells in scattered sections of the field.

T. W. Murray and associates occupy a different position in regard to their reason for attacking proration, as these operators have completed five wells on as many small tracts under the name of M. & G. Oil Company. Most of these wells are situated in the vicinity of Overton, and are either making water, or are situated dangerously close to the advancing water table. Properties of M. & G. Oil Company were given special military guards when the officers of the company made a brief defiance of the military forces on the afternoon of February 26 by breaking the seal from the well valves, and producing them in the presence of three civil peace officers of Overton. The latter were invited witnesses. Such procedure is being taken by the company in an effort to obtain a special production concession because of water hazard. No allowances have been made for properties facing the possibilities of early water flooding through the natural rise of the water table on the west flank of the field.

### Antis Claim Market

These anti-prorationists are confident that they will be successful in obtaining a market through local refineries and various major and independent purchasers from distant points for all oil that can be produced in throwing the field on a wide open production basis, and are agreeable to taking whatever price may be bid in by such purchasers in order to accomplish a quick turnover on all or a portion of their investment.

A number of local refineries represent an investment that is actually less than the average cost of one of the 4300-odd oil wells in the East Texas field. Owners of such plants would have conditions arise that would force all of these wells to go on an open flow basis as market outlets became obtainable in order that the plants could procure an ample quantity of cheap crude.

Straight skimming plants are unable to break even on operations when paying the field's posted price of 83 cents per barrel for crude under prevailing refined oil markets. Five of the 18 completed plants in the district are inactive for this reason. The majority of the straight skimmers have remained in operation through the purchase of crude at distress prices, with the bulk of the supply since December 20 coming from wells that were denied a market for oil produced on Sundays. Then properties that have clouded titles offer another source, as owners of such leases cannot get prompt settlements for crude delivered to majors without posting bonds to guarantee

(*Continued on page 55*)

# Commission Issues East Texas Rules; Soldiers Remain

## Conservation order applies to properties relieved from military under injunction, otherwise troops still rule

By JACK LOGAN
*Staff Representative*

AUSTIN, Texas.—A turbulent week for proration in East Texas ended February 27 with the militia still sentinels over all wells in the big field except the few involved in the federal injunction suit, with Governor Ross S. Sterling, commander-in-chief of the soldiers, seeking forgetfulness by going fishing in a stream among the hills west of Austin, and with E. F. Smith and Dan G. Moody, attorneys for the governor, speeding toward Washington to attempt to obtain from the Supreme Court of the United States a stay of execution of a three-judge federal court order announced at Tyler February 26, enjoining the governor and his martial law forces from enforcing oil proration orders against E. Constantin and J. D. Wrather, plaintiffs in the suit. The court had refused the defendants a stay of the injunction pending appeal to the Supreme Court.

The Railroad Commission of Texas in the meantime found itself in position to control or attempt to control nothing but the properties of the mentioned plaintiffs, although it had issued orders February 25 designed to apply to the entire four-county field, anticipating that martial law control would be lifted. Finding that the court order restrained him only in connection with the Constantin-Wrather properties, however, Governor Sterling declined to lift martial law in the remainder of the field, issued a new proclamation to that effect; and said that he would leave to the railroad commission, normal administrator of conservation laws, the regulation of the properties of Constantin and Wrather, which he referred to as comprising "a little kingdom all its own."

### More Suits Filed

Meanwhile numerous East Texas operators were attempting to free themselves of military and civil supervision as applications for injunctions against both Governor Sterling and the railroad commission piled up in the courts at Tyler. With regard to suits against the commission, Fred Upchurch, assistant attorney general, and legal advisor to that body, has indicated he will file cross-actions in an effort to prevent the field from running wild as it did last summer.

Under the martial law orders of Governor Sterling production in the East Texas field is limited to 75 barrels per well daily. The new railroad commission order makes the same restriction up to March 16, but provides that from that date until May 1 restriction will be on the basis of 325,000 barrels daily for the whole field, with that total divided equally among all wells in the field. On March 15, it was provided, the per-well allowable would be fixed by dividing the field allowance by the number of wells producing or expected to be completed within the succeeding 15 days; and on April 1 and April 16 the per-well allowance would be readjusted on the same basis. With new wells coming in, therefore, the per-well quota would gradually decline.

In the order the commission declared that in the past there has been too rapid withdrawal from the East Texas field, resulting in excessive decline in mean bottom hole pressure; and that such conditions have led to dissipation of reservoir energy, waste of gas through high gas-oil ratios resulting from liberation of free gas, and failure to utilize fully the gas energy and water drive of the field by producing oil slowly enough to permit the water to come in and gradually and effectually displace the oil. For correcting those conditions and attaining maximum ultimate recovery the commission expressed the belief that production of the field should be held to slightly more than 300,000 barrels daily as a maximum, and that production less than that amount would be beneficial. Testimony offered to the commission at a hearing of East Texas operators February 12 furnished the basis for the order. The order declares that none of its provisions are to be construed as affording relief from duties and obligations imposed by the "common pur-

*(Continued on page 44)*

***A second "little kingdom," free of martial law restraint, was created in the East Texas oil field Monday, February 29, when Judge Randolph Bryant issued a federal court order restraining Governor Ross S. Sterling and his martial law aides from enforcing proration orders against five wells of Peoples Petroleum Producers, Incorporated, a Louisiana concern.***

***Like the properties of E. Constantin and J. D. Wrather, plaintiffs in the original suit attacking martial law, these wells are left to the Railroad Commission of Texas for control by the court order. When restrained in connection with the Constantin-Wrather properties through filing of a federal court decree at Tyler February 26, Governor Sterling referred to those properties as "a little kingdom all its own," which would be left to the railroad commission.***

***Peoples Petroleum Producers, Incorporated, has also filed a supplemental petition asking injunction against the railroad commission to restrain it from enforcing state conservation laws, but the court had not acted upon the plea early this week.***

***Meanwhile no court action has been taken on eight other petitions seeking injunctions against the governor and the commission, seven of them stressing objections to the state conservation laws, as contrasted with the Constantin-Wrather and the Peoples Petroleum suits stressing pleadings against martial law.***

# The Physical Characteristics of Mud Fluids

By RICHARD C. KERR
*Los Angeles, California*

*EVER since mud fluids have been used as an aid to the drilling of bore holes, there has been wide difference of opinion among well drillers as to the duties of these fluids, and particularly violent disagreement as to the physical and chemical characteristics to be desired under the varying circumstances that developed.*

*A clear understanding of various elements that enter into the physical make-up of a mud fluid is a great aid to the efficient handling of the material in ordinary practice, and is an absolute necessity to the solution of new problems.*

"MUD FLUIDS" are not true fluids. They are complex fluid mixtures and as such differ from true fluids in many of their characteristics.

The term "mud fluid," however, is in such general use and is so descriptive of most of the properties of the material that there is certainly no need of any change.

The physical characteristics of a mud fluid can be grouped under the following headings:

A. Weight or Specific Gravity.
B. Consistency.
   1. Viscosity.
   2. Plasticity of the solids.
   3. Liquid state.
   4. Dispersion.
   5. Floculation.
   6. Jell-like structures.
C. Mechanical analysis.
D. Minor physical properties.

### Mud Weight

Weight is perhaps the most important physical property of drilling mud fluid. A clear recognition of the difference between weight (specific gravity) and thickness (viscosity) is an absolute necessity to a proper solution of mud problems in the field.

This distinction has been recognized for years and has been repeatedly stressed in the literature,[1] and in the discussion,[2] but many men who are handling the mud situation at important wells do not differentiate between these two properties.

### Units of Mud Weight

Mud weights are ordinarily measured in pounds per gallon, pounds per cubic foot or in specific gravity.

Specific gravity is by far the most convenient unit for engineering purposes and is a recognized standard in scientific work throughout the world. The general use of this unit would be of great benefit to all concerned and if adopted would, in a short time, be as graphic and as concrete to the field man as is the present system.

Pounds per cubic foot is the next best unit as it fits in most readily with our ordinary calculations of pressure and volume. The dimensions of our holes, pits and tanks are given in feet. The calculation of volume in cubic feet and of fluid pressure in pounds per square inch are considerably easier to perform than if the weight is given in pounds per gallon.

Aside from specific gravity, however, the other two units mentioned are not sufficiently different to make it a matter of great consequence which is to be used. The general adoption of one or the other would be a most desirable step, if it could be accomplished without bloodshed.

In conformity with our other systems of weights and measures we really should complicate the thing completely by using drams per U. S. gallon or scruples per fluid ounce.

### Necessity of Mud Weight

The most important function of mud weight is the creation of high hydrostatic pressure on the bottom and against the sides of the bore hole. This high pressure on the inside tends to prevent the entrance into the hole of high pressure gas, water and oil, and is a great aid to holding up the walls of the hole while drilling through loosely consolidated or caving formations.

High pressure may also be obtained in the hole by maintaining a pump back pressure on the mud column. At the present time one of the major operators at Kettleman Hills is drilling through a packing gland with a back pressure of over 1000 pounds per square inch. This pressure is maintained at all times, even while running drill pipe and casing. This method is certainly effective, particularly for shallow depth operations and in certain cases is undoubtedly necessary. However, the cost of equipment, and the cost and difficulty of operation, would suggest that the possibilities of high weight mud be examined before undertaking such a method.

### Gas Pressure

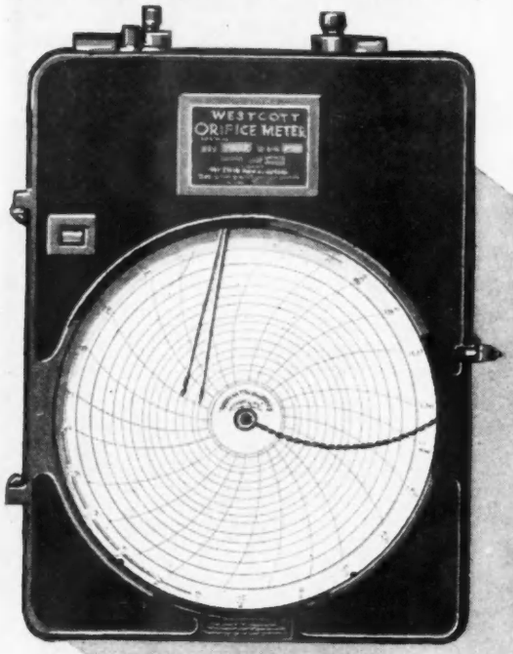
There are numerous cases in which the gas pressures encountered in a well are much higher than the hydrostatic pressure at the bottom of the hole would be, if full of water.

According to Stanley C. Herold,[3] wells drilled into reservoirs in hydraulic control have gas pressure equal to the total head of water on the reservoir.

Herold,[4] in a study of Kettleman Hills gas pressures has reported that the gas pressure at the bottom of one of the wells on the North Dome is equal to the hydrostatic pressure of a column of water operating from an elevation of 600 feet above the elevation of the derrick floor, which is approximately the height of the water inlet into the producing formation at the Big Tar Canyon some 10 miles to the west.

In the particular case of Shell Oil Company's Armstrong

# INSTANTANEOUS...



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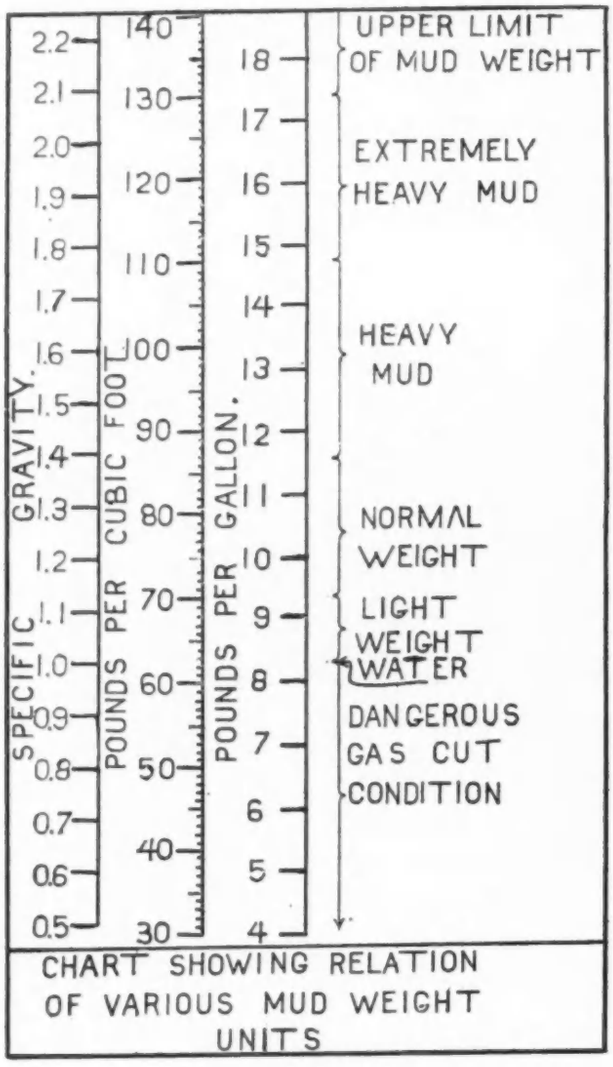



CHART SHOWING RELATION OF VARIOUS MUD WEIGHT UNITS

FIGURE 1

No. 1, as reported in Herold's paper[4], a fluid weight of 72 pounds per cubic foot (9.6 lbs./gal—1.16 Sp. Gr.) was insufficient to hold down the gas pressure encountered Doherty, Gill and Parsons [5] report conditions at Hull and High Island, Gulf Coastal Fields where gas pressures exceeded the hydrostatic head of 80 pound mud.

In developing his theories on volumetric and capillary controlled reservoirs Herold[3] further brings out the fact that incertain cases gas pressures may be encountered that are much higher than the present Artesian head could produce. This condition possibly having been brought about by accumulation in past geological time under a considerably higher Artesian head than now exists or by the evolution of gas after the accumulation. In any case, the possibility of encountering high pressure gas is well known and the necessity of holding down this gas is the most important function of weight, since no other property of the mud fluid can accomplish this duty.

It is necessary to maintain a hydrostatic pressure inside the hole that is considerably higher than the gas pressure on the outside.

Figure 2 is a diagram showing the hydrostatic head for depths down to 10,000 feet and for mud weight between gas-cut mud, water and 140 pounds per cubic foot mud.

### Water Pressures

Unless driven into the hole by high pressure gas, water can have no excess pressure beyond the normal Artesian head, but this, as in the case of the Kettleman Hills, can be considerably higher than the pressure of a hole full of water. If the water is to be excluded, a hydrostatic pressure greater than this must be maintained at all times, as the filter pack on the walls can not be relied upon to hold out reverse pressures.

### Holding Up the Walls of the Hole

Unconsolidated zones or soft plastic beds have a decided tendency to cave or to squeeze into the hole.

Maintaining a higher hydrostatic pressure inside the hole than is present on the outside will reduce the caving and squeezing to a minimum by simply pushing against the wall, and this pressure should never be reduced below a safe point. Doherty, Gill & Parsons [5] have cited an excellent case of this principle.

### Driving of Mud Into the Formation

The penetration of mud into the formation and the building up of a firm mud-cemented and plastered wall is of great importance.

The depth of penetration of the wall by the mud, all other things being equal, is dependent on the pressure available to force it out into the formation. Naturally, the greater the pressure difference from inside to outside, the greater the depth of penetration and the tougher and firmer is the filter pack formed in the wall.

### Minor Function of Weight

Removing of cuttings from the hole is aided by high specific gravity because of increased flotation, but dropping of cuttings in the ditch is retarded for the same reason. Mud of high specific gravity is frequently used to a great advantage in pushing cement up behind the casing with little strain on the pumps, and with much greater speed in placing the cement.

### Building Weight

The addition of colloidal material to water results in a very rapid increase in "viscosity."

A solution of water and high grade bentonite, which is

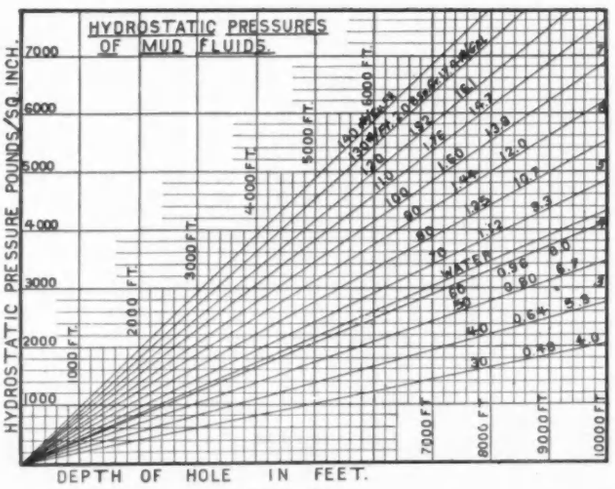
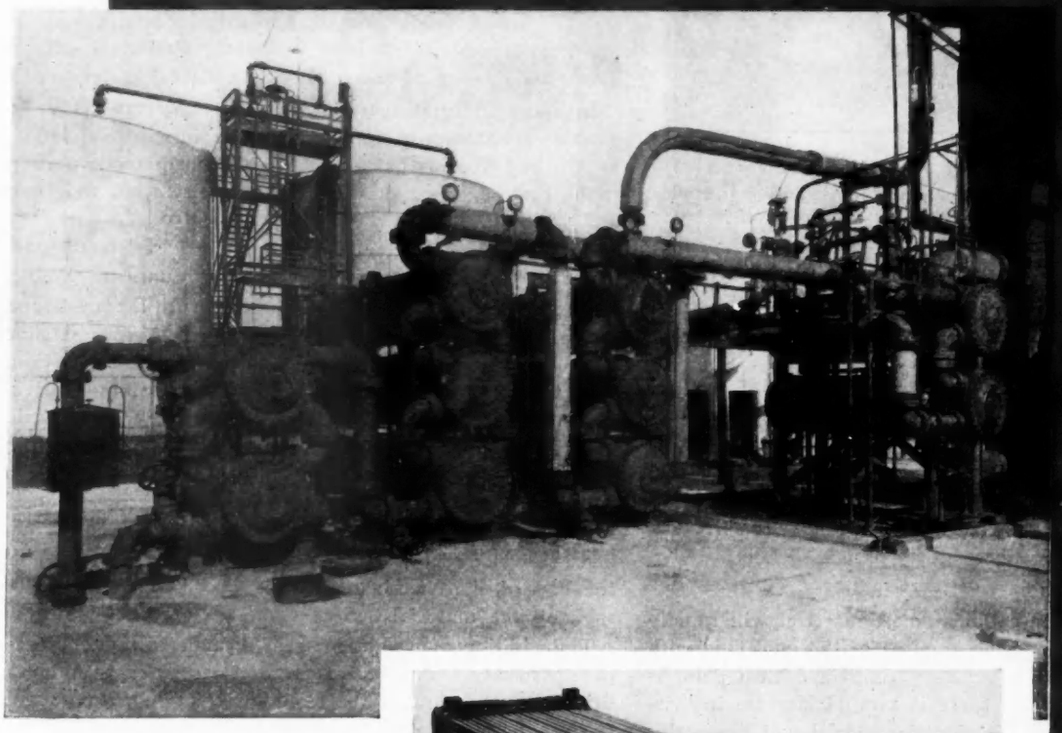
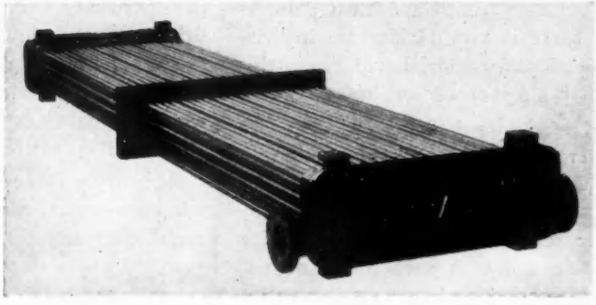



FIGURE 2

# LET TONCAN RELIEVE YOU OF CORROSION TROUBLES





*Top—Absorption plant as manufactured by the C. F. Braun Corp., Alhambra, Calif. All units in photo use standard Toncan Iron Pipe for tubes.*

*Right—Expansive type cooling sections as used in gasoline absorption plants. All tubes are standard Toncan Iron Pipe.*

Pipe corrosion and costly plant "shutdowns" go hand in hand. Yet these expensive non-productive periods are largely unnecessary since the introduction of Toncan Iron Pipe.

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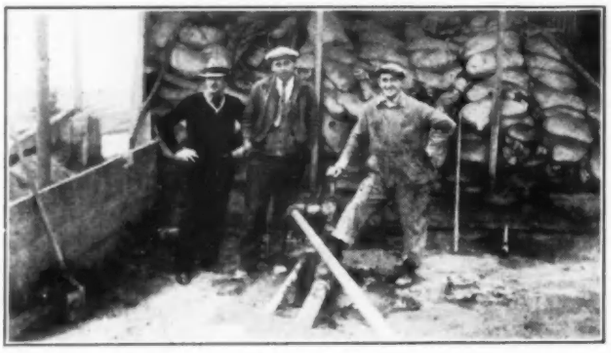

PLATE 1

*Suction mud mixed installed at Shell Oil Company's Williams 1, Semitropic, California. The men in the picture are C. L. Anderson, Seth Penfield and Charles Moore*

very high in colloidal and semi-colloidal content, will form a stiff semi-solid mass at about 64 pounds per cubic foot, (8.5 lbs./gal.—1.03 Sp. Gr.).

Ordinarily clay having a much higher percentage of inert non-colloidal matter will form a good fluid mud up to 72 pounds per cubic foot. (11.0 lbs./gal.—1.32 Sp. Gr.) can

Some clays that are used for rotary mud have a still higher content of inert matter and fluid muds up to 82 pounds per cubic foot. 11.0 lbs./gal.— 1.32 Sp. Gr.) can be built. This is a very heavy clay base mud and is indicative of a high percentage of inert matter.

The addition of non-colloidal inert material will rapidly increase the weight (specific gravity) of the mud fluid with a very slow increase in "viscosity" until a critical point is reached. After this point there is a rapid increase in "viscosity." Almost any non-colloidal material will cause this increase in weight without rapid increase in "viscosity."

A light weight colloidal mud may become charged with fine sand and run up to weights of 90 pounds per cubic foot (12.0 lbs/gal.—1.44 Sp. Gr.) or more without marked change in "viscosity." This condition is of course highly undesirable since even fine sand has a bad abrasive action on the pumps and a mud loaded with such fine sand will have much less efficient plastering and penetrating action on the wall of the hole.

The most effective means of securing high fluid weight is by the addition of a weight material to the natural mud. This weight material should be very finely ground. It should be soft and non-abrasive and should be chemically inert. A light color is desirable. When mixed with a certain small percentage of colloidal matter the material should form a high weight fluid mud that will not settle rapidly and it is very important that the material should not form a hard dense cake at the bottom of the container on standing.

This inert weight material will not stay in suspension in clear water by itself unless enough material is used to form a thick paste. For each weight material used and for each weight of fluid desired there will be a definite ratio of colloidal matter to the inert matter necessary to maintain suspension. Thus, for example, a higher percentage of colloidal matter will be necessitated to maintain a 90 pounds per cubic foot (12 lbs./gal. 0 1.44 Sp. Gr.) mixture of barium sulphate in suspension, than will be required to maintain in suspension the same weight mixture of non-colloidal silica.

The materials that are in common use for such weighting purposes are the iron oxides, the barium compounds, (both of which are processed with a small percentage of Bentonite for suspension qualities), and a special non-colloidal silica. The non-colloidal silica has a specific gravity of only 2.6 but fluid muds up to 115 pounds per cubic foot (15.4 lbs./gal.—1.85 Sp. Gr.) can be built that have excellent suspension qualities and that will not settle out into hard dense cakes at the bottom of the container. The material is white, finely ground, non-abrasive and chemically inert. It mixes readily into a smooth, fluid mud and requires a minimum of accompanying colloidal material.

In adding weight material to the rotary mud it is desirable to secure a smooth velvety mixture of definite weight and for this purpose a mechanical mixer is perhaps to be desired, since the texture "viscosity" and weight of the resulting mixture is more easily controlled.

The jet type of mixer is, however, very satisfactory and if properly handled can produce a smooth uniform product.

In general the jet type mixer is used with a cone hopper into which the dry materials are dumped. A very satisfactory, labor-saving mixer was installed at Shell Oil Company's Williams 1 at Semitropic by the drilling superintendent, Seth Penfield, using a device designed by Charles Moore, one of the members of his crew. The cone hopper was removed and a two-inch line with double swings was connected. The suction on the two-inch line was sufficient to draw in dry mud from the pile as fast as it could have been shoveled into a hopper. It is only necessary to ram the end of the line into the pile of dry mud and let it suck up the material.

The addition of weight material to mud always increases the "viscosity," and it is therefore necessary to thin the drilling mud below the desired "viscosity" before adding the weight material.

In case it is desired to build a mud of maximum possible weight, it becomes necessary to discard all the natural mud and build up a new mud using weight material only.

Recently an order of barium sulphate without Bentonite admixture was prepared by a Pacific Coast weight material company for export to a South American oil company. It was their desire to prepare a mud fluid of 140 pounds per cubic foot, (19.0 lbs./gal. 2.25 Sp. Gr.) and the attainment of such weight with a permissible low viscosity, necessitated the entire elimination of clay or bentonite.

Fluid of such weight is hardly an ideal drilling fluid, the very weight of the fluid will prevent any but the coarsest and heaviest of the drill cuttings from settling out in the ditch, and any fine sand or clay material is certain to increase the viscosity and to reduce the weight as soon as the drilling is started.

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[1]R. E. Collum, "The Mud Problem in Rotary Drilling," THE OIL WEEKLY, June 24, 1924.

[2]S. L. Stovell, "Proper Consistency of Mud in Rotary Drilling," *Oil Age*, March, 1923.

[3]Stanley C. Herold, "*Analytical Principles of the Production of Oil, Gas and Water from Wells.*" A text-book, Stanford Univ. Press, 1928.

[4]Stanley C. Herold, "What a Drainage Study Shows of Ket. Hills' Future." *Petroleum World*, April, 1930.

[5]Doherty, Gill and Parsons, "Drilling Fluid Problems and Treatment in the Gulf Coast." A. P. I. mid-year Meeting, Dallas, Texas, June 4, 1931.

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**This is the first installment of a comprehensive discussion of mud fluids by Mr. Kerr, which will appear in three parts. The installment deals further with mud weights and viscosity, and will appear in an early issue.**

*Paper read before American Institute of Mining and Metallurgical Engineers, New York meeting, February, 1932*

# Flow of Air and Gas Through Porous Media*

By JOSEPH CHALMERS,† D. B. TALIAFERRO, JR.,‡ and E. L. RAWLINS§
*Bartlesville, Oklahoma*

PROBLEMS dealing with the movement or migration of fluids through porous beds have been the subject of much research. The subject is not peculiar to the production of oil and gas, as many investigators have studied the nature of this movement and its relationship to the problems of other industries. Darcy[1] conducted a series of experiments relating to the percolation of water through filter beds. King[2] carried on an extensive series of laboratory experiments with the object of formulating some conception of the rate of movement of water through soils and sand strata in the drainage of surface water into underground channels and subsequent recovery of this water through wells drilled into the source beds for irrigation purposes. Slichter[3] undertook a study of the same problem from a mathematical standpoint, and more recently Furnas[4] has investigated the flow of gases through beds of broken solids with particular reference to blast-furnace operation. With specific reference to gas production, Muskat and Botset[5] of the Gulf Research Laboratory undertook an experimental study to establish quantitatively the characteristics of and laws governing the flow of gases through consolidated and unconsolidated porous materials of fine texture with a view of predicting the performance of gas in an underground reservoir.

There seems to be a general agreement that many of the relationships between the numerous factors influencing the flow of fluids through porous materials are far too complicated to be attacked by analytical methods based upon a knowledge of hydrodynamics. For gases, the laws of thermodynamics also have an important bearing. Most of the available data in the literature, if not discordant and contradictory, cover a very limited range of flow conditions. In view of the intricate nature of an analytical solution of the problem and the promise of empirical relationships derived from experimental data, the Petroleum and Natural Gas Division of the United States Bureau of Mines has undertaken a comprehensive study of the subject of fluid flow through porous media, based on laboratory experimental data. The purpose of the present investigation is to verify and extend the data bearing upon the problems directly connected with the production of gas and oil.

*Published by permission of the Director, U. S. Bureau of Mines.
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[1] H. Darcy: Les fontaines publiques de la ville de Dijon. Paris, 1856.
[2] F. H. King: Principles and Conditions of the Movements of Ground Water. U. S. Geol. Survey Nineteenth Ann. Rept. (1897-98) Pt. 2, 61—294.
[3] C. S. Slichter: Theoretical Investigation of the Motion of Ground Waters. U. S. Geol. Survey Nineteenth Ann. Rept. (1987-98) Pt. 2, 295—394.
[4] C. C. Furnas: Flow of Gases Through Beds of Broken Solids. U. S. Bur. Mines Bull. 307 (1929).
[5] M. Muskat and H. G. Botset: Flow of Gas Through Porous Materials. Physics (1931) 1, 27—47.

### Scope of Paper

To date, some 60 tests have been made covering the flow of air and gas through different grades of unconsolidated sand and four sizes of lead shot. These tests also include gas flow under different pressure conditions. This paper presents some of the data obtained experimentally and points out some of the relationships that are being studied.

### Equipment and Materials

The flow tubes used in the investigation and in which the various sands and sizes of shot were packed, consisted essentially of sections of pipe with companion flanges at both ends of each section. The sand was held in place by screen-covered perforated plates at each end of the tubes. The tubes were made up in four different sizes: namely, 3, 2½, 2 and 1½ inches in diameter by approximately four feet long. Openings spaced two feet four inches apart in the walls of the tubes were used for pressure connections and to insert thermocouples for temperature measurement. Two sets of openings, one on the top and the other on the side of the pipe, were eight inches from the sand face at each end of the tube in order that any flow disturbance at the face of the sand would not influence the results. One set was used for measuring the temperature and pressure at the center of the tube cross-section and the other for measuring the pressure at the wall of the tube. Tubes three inches in diameter and approximately 12 feet long, with two sets of five openings similarly spaced, were constructed for special tests. Figure 1 shows the complete laboratory hookup, and one of these special tubes is shown at *a*. The end taps on the long tubes were 16 inches from the face of the sand.

By providing a companion flange of the welding-neck type to connect the tubes into the system on the upstream end, it was readily possible to have this end of each tube bored smooth and threaded to accommodate the perforated plate *i* and follower *j*. A detail of the combination thermo couple and pressure connection is shown at *h'*. The purpose of the back-pressure cylinders *c* connected to the manometers was to increase the range of the manometer readings and facilitate instantaneous readings of the several pressures. Each manometer was capable of a working pressure of 300 pounds per square inch. Spring-type pressure gages were not considered sufficiently accurate, and slight fluctuations in the pressure control made the use of dead-weight gages impractical at these points in the system. Most of the gas-flow tests were made at Amarillo, Texas, where the gas supply was obtained from a dry-gas well having an open-flow capacity of 50 million cubic feet per day. Under the flow conditions of these tests, the well pressure remained almost constant and dead-weight gages were used exclusively for the higher pressures.

Ottawa glass sand and Wilcox sand were chosen as por-

ous media for the experiments because of the rounded character of their grains. The coarse sizes predominated in the Ottawa glass sand and the fine sizes in the Wilcox sand. Screened sizes of a building sand were chosen because of the more angular character of the grains. Before screening, the sand was thoroughly dried by heating in order to reduce hygroscopic moisture and thereby facilitate the screening operations on a three by five foot electric vibrating screen. All of the sands were passed through successive sizes of screen repeatedly until a close separation between narrow limits in grain diameter was obtained. After screening, the graded sand was kept in paper bags to prevent adsorption of moisture while in storage. The sands, thus prepared, later were packed into the flow tubes.

Table 1 shows the sands and screen analyses of the grain sizes and also the numbers and nominal diameters of the lead shot used in the experiments.

**TABLE 1**
**Screen Analysis of Sands and Sizes of Lead Shot Used in Flow-tube Tests**

| Sands | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Description of Sands | | | | Lead Shot | |
| Screen | Range of Diameter of Grains, In. | 20–28 Bldg., Per Cent | 20–28 Ottawa, Per Cent | 48–65 Wilcox, Per Cent | 120–170 Wilcox, Per Cent | Designation | Nominal Diameter, In. |
| Mesh Mesh | | | | | | | |
| Thru 14 on 20 | 0.046 –0.0328 | 0.28 | 0.59 | | | No. 1 | 0.16 |
| Thru 20 on 28 | 0.0328–0.0232 | 97.51 | 95.98 | | | No. 5 | 0.12 |
| Thru 28 on 35 | 0.0232–0.0164 | 2.16 | 3.43 | | | No. 12 | 0.05 |
| Thru 35 on 48 | 0.0164–0.0116 | | | 0.06 | | | |
| Thru 48 on 65 | 0.0116–0.0082 | | | 95.33 | | | |
| Thru 65 on 80 | 0.0082–0.0069 | | | 1.72 | | | |
| Thru 80 on 100 | 0.0069–0.0058 | | | 2.67 | 0.15 | | |
| Thru 100 on 150 | 0.0058–0.0041 | | | 0.19 | 44.11 | | |
| Thru 150 on 200 | 0.0041–0.0029 | | | 0.01 | 53.62 | | |
| Thru 200 | Less than 0.0029 | | | | 1.76 | | |
| Loss . . . . . | | 0.05 | 0.00 | 0.12 | 0.36 | | |
| Total . . . . . | | 100.00 | 100.00 | 100.00 | 100.00 | | |

## Experimental Procedure

With the flow tube standing on end and the bottom flanges tightly bolted together so as to hold the screen-covered perforated plate in place, and while the tube was being pounded with hammers, sand was slowly poured into the tube until it was filled. Then, the upper perforated plate $i$ and follower $j$ (Figure 1) were put into place, and the pounding was resumed. This pounding was continued while tightening the follower until successive poundings from the bottom of the tube to the top did not lower the position of the top perforated plate. During this procedure, it was often necessary to remove the top follower and plate in order to add more sand. In each packing, the sand was carefully weighed into the tube. Having previously determined the volumetric capacity of the flow tubes and the specific gravities of the various sands, it was possible to compute the percentage of pore space for each pack from the equation:

$$\text{Percentage pore space} = 100\frac{(Vd - W)}{Vd}$$

where $V$ = volume of flow tube, cubic centimeters,
$d$ = specific gravity of sand,
$W$ = weight of sand, grams.

No correction was made for hygroscopic moisture.

The flow-tube tests followed a simple procedure. Either air or gas was allowed to flow through the sand-packed tube under a series of different pressure conditions, and the corresponding rates of air or gas flow were measured. After each change in pressure condition, enough time was allowed for pressures and temperatures to become stabilized before taking any readings. A positive displacement meter $o$ for gas measurement is shown in Figure 1. This meter was used in all of the laboratory runs, but in the tests conducted in the field with the flow tubes connected to a gas well an orifice meter was used instead of the displacement meter. Before and after each test the displacement meter was checked against a critical flow prover at several rates of flow covering the range of the test. This was done to assure correct flow measurement. To assure correct flow measurement with the orifice meter used in the field tests, accurate determinations of the orifice plate coefficients over a range of pressure differentials from 100 to 40 inches of water were made for each size of orifice. The delivery of each orifice plate was also compared with the next larger and next smaller orifice to assure proper correlation of the orifice calibrations. In actual operation the orifice meter discharged to atmosphere, under which condition it was calibrated.

The flow tests were conducted under two separate conditions of pressure. Data were obtained while the gas was flowing from a series of different upstream pressures ranging between 400 pounds per square inch and a few inches of water to a series of downstream pressures ranging between 380 pounds per square inch and a few inches of water. Data also were obtained while the gas was flowing from a constant upstream pressure to a series of different downstream pressures, the ranges in the rates of flow under the two sets of pressure conditions being the same. It was found by using the method of analysis of results demonstrated in this report that the actual pressure of the gas in the porous media was not important; instead, the pressure factor controlling the rate of flow was the actual difference of the squares of the upstream and downstream pressures, regardless of the magnitude of these pressures.

In the use of the several flow tubes of different diameters, it was noticed that for the relatively small grain sizes the rate of flow was proportional to the cross-sectional area of the tube. In other words, slippage of gas along the wall of the flow tube was not evident. The data indicated also that the perforated plate construction at the ends of the tubes caused negligible flow disturbance.

## Results

### Temperature Gradient Due to the Joule-Thompson Effect

Throttling a gas adiabatically from a high pressure to a low pressure will cause the temperature of the gas to decrease, provided its initial temperature is below a certain characteristic value known as the inversion point of the gas. The position of this point varies with pressure. By "throttling" is meant that no work is done by the gas. This cooling effect is known as the "Joule-Thompson effect" in recognition of the famous "porous-plug" experiments performed by Joule and Thompson.[6] The Joule-Thompson effect is expressed as a difference between the temperature after throttling and before; it is a measure of the imperfection of the gas, because with a perfect gas there should be no change in temperature. Although the amount of cooling due to the Joule-Thompson effect is much less than that

[6] G. N. Lewis and M. Randall: Thermodynamics and the Free Energy of Chemical Substances. Ed. 1, 67-68, New York, 1923. McGraw-Hill Book Co.

E. W. Washburn: An Introduction to the Principles of Physical Chemistry, Ed. 1, 264-267. New York 1915. McGraw-Hill Book Co.

J. E. Emswiler: Thermodynamics, Ed. 1, 256-57. New York, 1921. McGraw-Hill Book Co.

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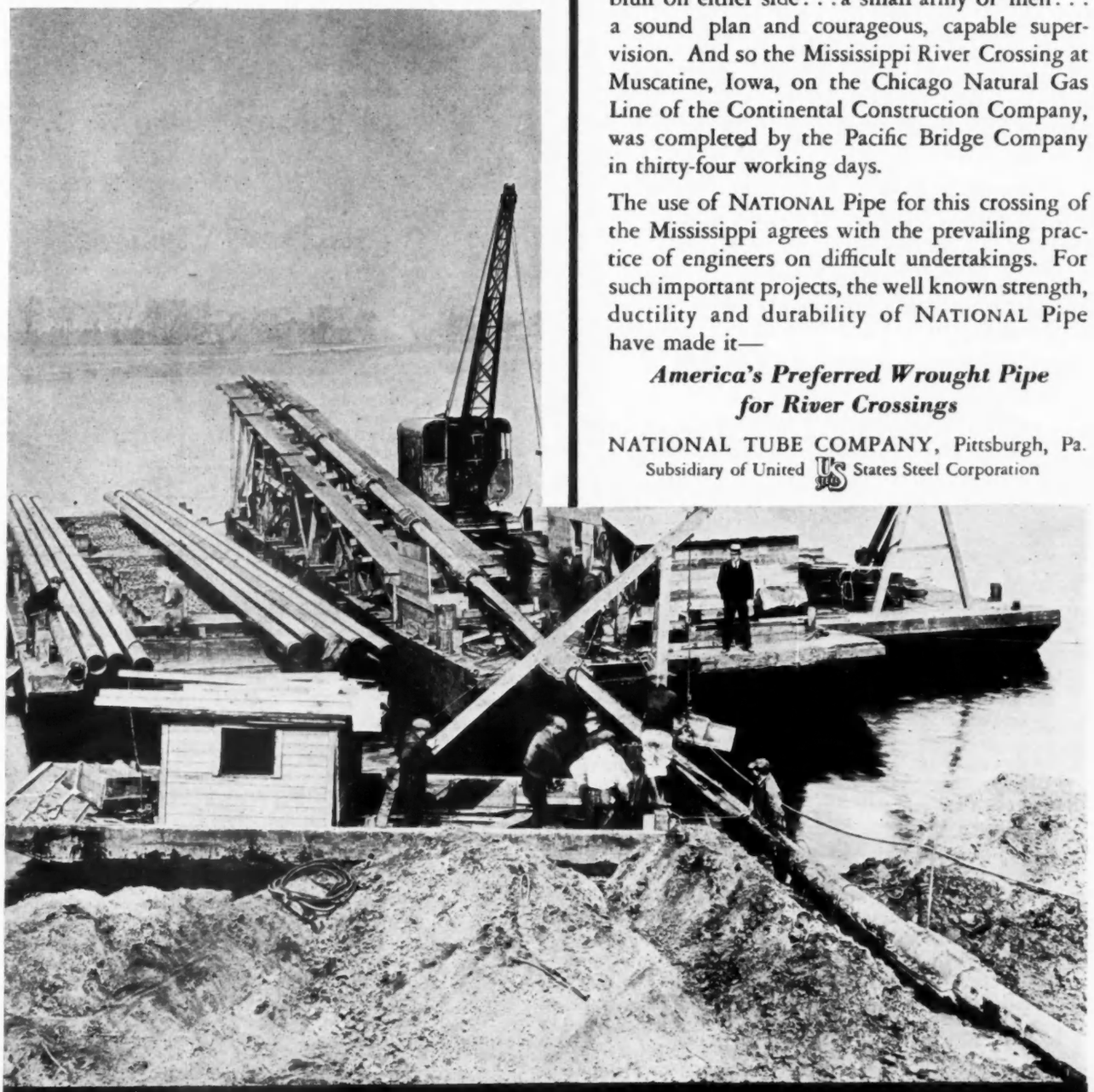

# NATIONAL PIPE

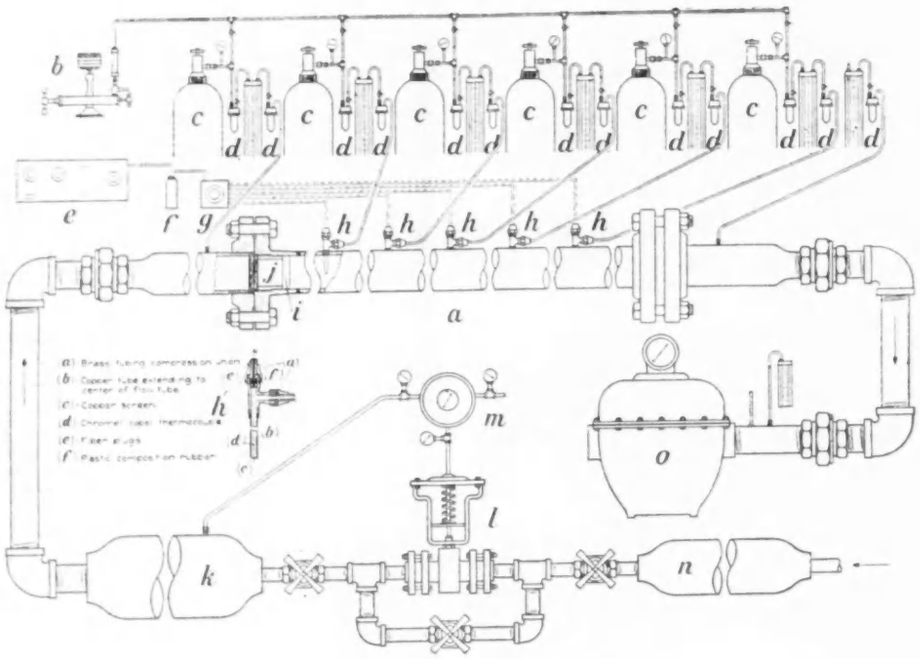


**FIGURE 1**

**Flow Tube and Pertinent Apparatus**

*a*. Flow tube.
*b*. Dead weight gage.
*c*. Back-pressure cylinders.
*d*. Manometer mercury traps.
*e*. Potentiometer.
f. Thermocouple cold junction.
*g*. 10-point rotary switch.
*h*. Combination thermocouples and pressure taps.
*h'*. Detail of combination thermocouple and pressure tap.
*i*. Screen-covered perforated plate.
*j*. Perforated plate follower.
*k*. Pulsation dampener.
*l*. Pressure regulator motor valve.
*m*. Pressure regulator controller.
*n*. Calcium chloride dryer.
*o*. Positive displacement meter.

which accompanies the adiabatic expansion of a gas doing work, and is very small for gases at moderate pressures, it is frequently of considerable magnitude for gases under high pressures. The amount of cooling is a function of the pressure drop and also increases with the lowering of the initial temperature.

Figure 2 shows isotherms for a longitudinal section of a three by 12-foot flow tube. Only one-half the diameter of the tube is shown. These data were obtained from one of the special flow tubes in which were placed three thermocouples at each of the five pressure-tap connections. The first thermocouple of each group was located in the sand one-fourth of an inch from the wall of the tube, the second seven-eighths of an inch from the wall of the tube, and the third at the center of the tube. Three groups of isotherms are given. The initial temperature of the air and gas entering the tubes was 70° F. Group A gives the temperatures through the tube for air flowing at a rate of 19.76 cubic feet per minute and a pressure drop from 376.26 pounds per square inch gage to 126.55 pounds per square inch gage with the tube covered with pipe insulation one inch thick. Group B is for air flowing at a rate of 21.12 cubic feet per minute and a pressure drop of 393.78 pounds per square inch gage to 133.09 pounds per square inch gage with the tube in a constant-temperature water bath at 70° F. There was a 2° difference in the temperature drop along the center line of the flow tube between these two tests. Although the rates of flow and the pressure drops were slightly different, a comparison of the two conditions of flow shows rather poor heat transfer through the sand. The temperature drop of about 6.5° F. along the center of the insulated tube compares faorably with the value obtained from the Joule-Thompson effect for air under similar temperature and pressure conditions. Group C, Figure 2, shows the temperature change for a natural gas having a specific gravity of 0.670, flowing at a rate of 31.52 cubic feet per minute, and a pressure drop of 396.13 pounds per square inch gage to 134.37 pounds per square inch gage. It is interesting to note the difference in temperature change between air and natural gas for almost the same pressure conditions. For air, the temperature change was 4.5° F., whereas for natural gas the change was 13° F. The writers have been unable to find any data in the literature on the Joule-Thompson effect for natural gas.

### Pressure Gradient Due to Rectilinear Flow of Gases Through Porous Media

From Figure 3, it is apparent that the pressure squared is a linear function of the distance along the flow tube. This corroborates the data obtained and the conclusion drawn by Muskat and Botset[7] and extends the range of the data from a difference of squares per foot of about 500 pounds per square inch squared to 15,550 pounds per square inch squared. Other tests, not included in this paper, have carried the difference of squares of the pressures per foot of length of 53,400 pounds per square inch squared. The relationship

[7] Reference of footnote 6.

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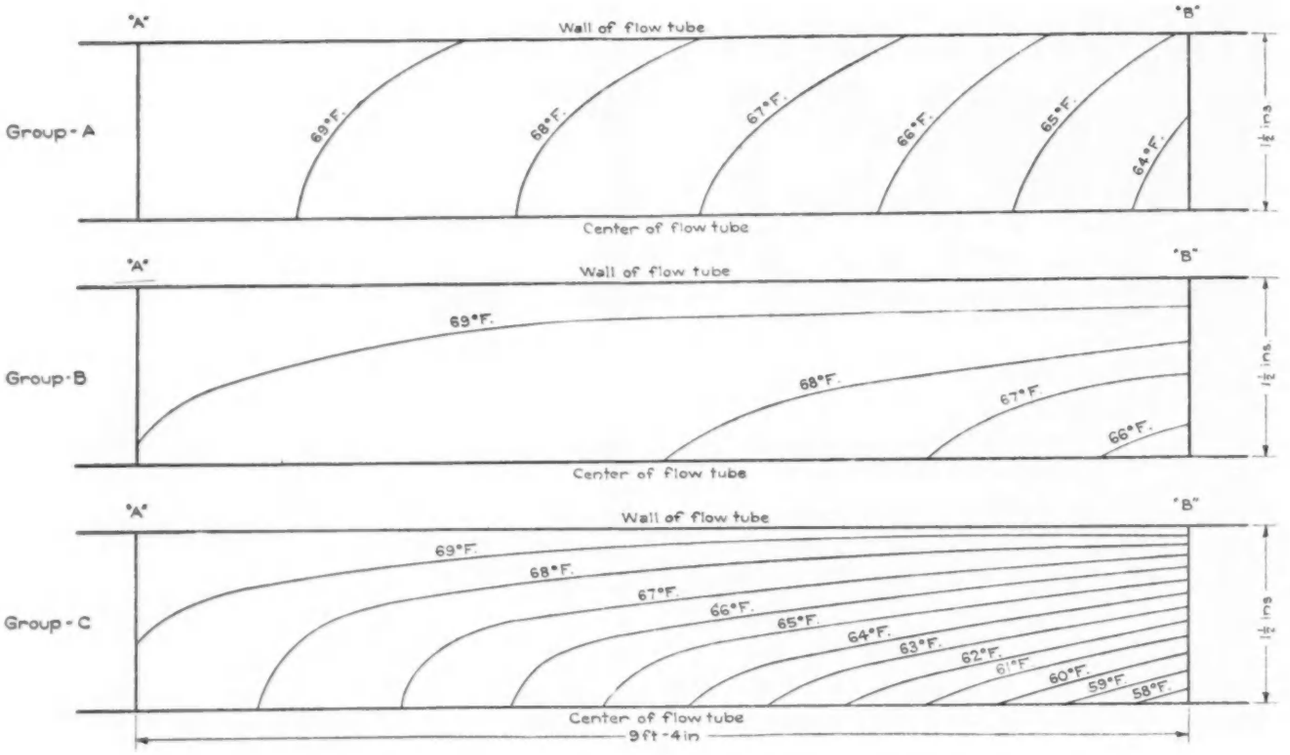


| Group | Flowing medium | Rate of flow, Cu. ft per min. | Pressure at "A", lbs per sq. in. absolute | Pressure at "B", lbs per sq. in absolute | Initial temperature of gas | Remarks |
|---|---|---|---|---|---|---|
| A | Air | 19.76 | 376.26 | 126.55 | 70°F | Tube insulated |
| B | Air | 21.12 | 393.78 | 133.09 | 70°F | Tube in water bath at 70°F |
| C | Nat. Gas | 31.52 | 396.13 | 134.37 | 70°F | " " " " " " |

**FIGURE 2**

***Temperature gradients in three-inch by 12-foot flow tube***

between pressure and distance may be expressed by an equation of the form

$$P = \sqrt{a + bs},$$

where $P$ = pressure at any point along the tube,
$S$ = distance along the tube, and
$a$ and $b$ = experimental constants.

It can be shown that the mean pressure in the tube, between any two points, is expressed by the equation:

$$P_M = \frac{2}{3}\left(P_1 + P_2 - \frac{P_1 P_2}{P_1 + P_2}\right)$$

where $P_M$ is the mean pressure, and

$P_1$ and $P_2$ are the pressures at the two points along the This equation is identical with Weymouth's equation for mean tube. This equation is identical with Weymouth's equation for mean pressure in a pipe line operating under high differential pressures.

### Empirical Flow Relationships

Several different types of equations may be used to express the relationships for the flow of gas through porous media. These empirical equations must of necessity express the flow relationships as they exist under the conditions of experimentation and are therefore concerned with rectilinear flow of gas through porous media under a condition of polytropic or exponential expansion of the gas. The curves of Figure 2 have shown that the flow condition is neither for isothermal nor adiabatic expansion of the gas but for some intermediate condition.[8] This is considered not to be a material handicap, as a similar type of expansion probably exists in actual underground conditions. With further study of the problem it may be possible to express the relationships as a function of the type of expansion. Also, it is believed possible to convert the equations for rectilinear flow into equations expressing the relationships for radial flow.

The following are the types of equations that have been considered:

$$P_1^2 - P_2^2 = aQ^n \qquad [1]$$

$$P_1^2 - P_2^2 = a(b^Q - 1) \qquad [2]$$

$$P_1^2 - P_2^2 = aQ + bQ^n \qquad [3]$$

where $P_1^2 - P_2^2$ is the difference of the squares of the pressures,

$Q$ is the rate of flow or mass velocity,

$a$, $b$, and $n$ are experimental constants.

It must be remembered that none of the above types of equations fit the experimental data exactly. They do give, however, a close approximation of the data.

The flow relationship of the type expressed by equation 1 holds true over limited ranges of flow. In this equation, $n$ is the slope of the curve when $P_1^2 - P_2^2$ is plotted against $Q$ on Logarithmic coordinate paper and changes progressively from a value of 1 to a value of approximately 2 for any given sand as the condition of flow changes from viscous to turbulent flow. Theoretically, 1 and 2 are the limits of the value of $n$ for isothermal expansion of the gas. In Figure 4, which shows the effect of grain diameter on flow of natural gas through porous

[8] H. C. Miller: Gas Lift Method of Flowing Oil Wells, U. S. Bur. Mines Bull. 323 (1930) 10.

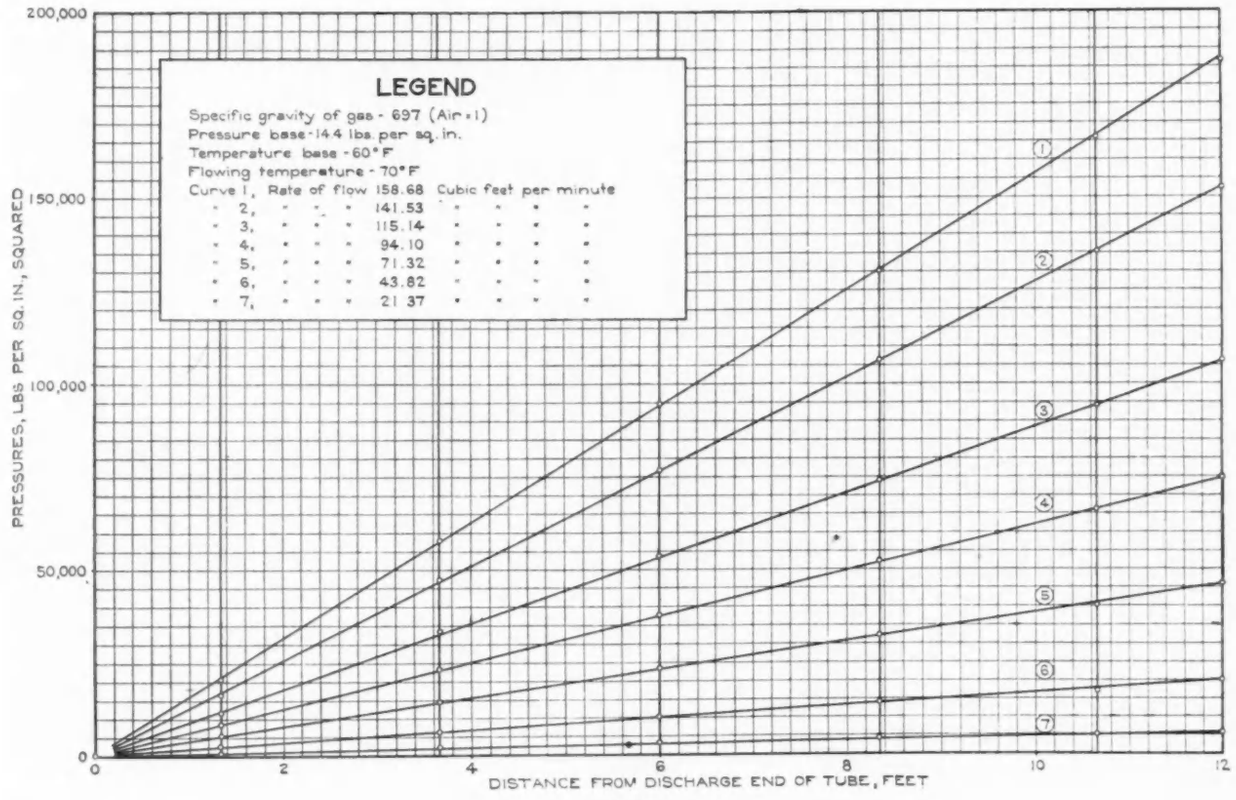


**FIGURE 3**

***Linear relationship between pressure squared and distance***

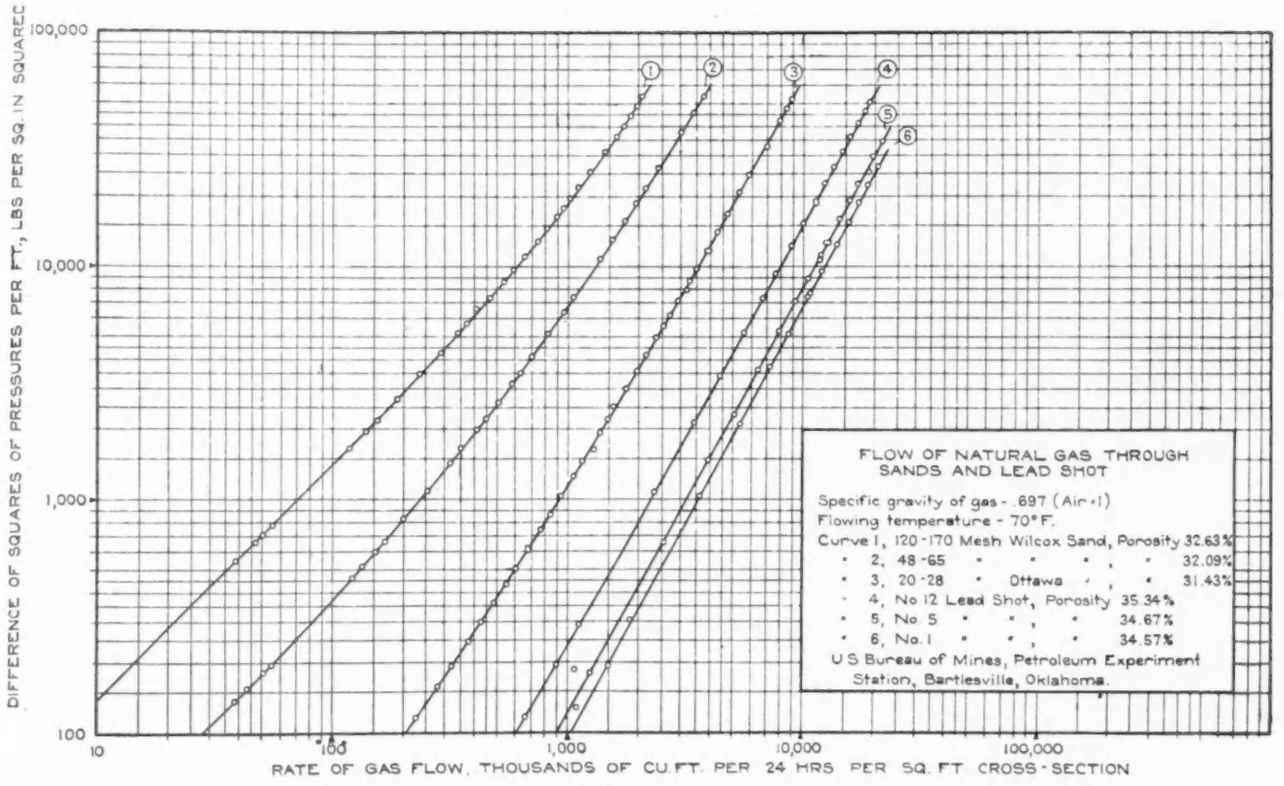
DIFFERENCE OF SQUARES OF PRESSURES PER FT., LBS PER SQ. IN SQUARED
100,000
10,000
1,000
100
10
100
1,000
10,000
100,000
RATE OF GAS FLOW, THOUSANDS OF CU. FT. PER 24 HRS PER SQ. FT CROSS-SECTION
FLOW OF NATURAL GAS THROUGH SANDS AND LEAD SHOT
Specific gravity of gas - .697 (Air=1)
Flowing temperature - 70° F.
Curve 1, 120-170 Mesh Wilcox Sand, Porosity 32.63%
" 2, 48-65 " " " " 32.09%
" 3, 20-28 " Ottawa " " 31.43%
" 4, No 12 Lead Shot, Porosity 35.34%
" 5, No. 5 " " " 34.67%
" 6, No. 1 " " " 34.57%
U S Bureau of Mines, Petroleum Experiment Station, Bartlesville, Oklahoma.
1
2
3
4
5
6

**FIGURE 4**

***Effect of grain diameter on flow of natural gas through porous media***

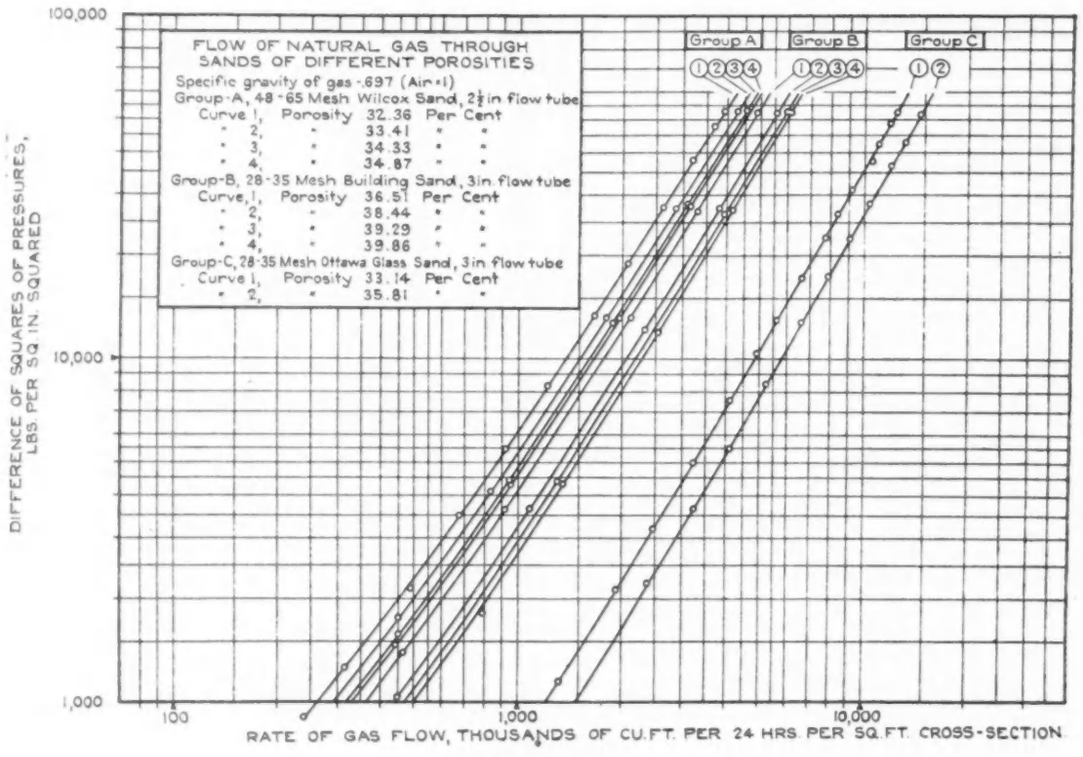
FLOW OF NATURAL GAS THROUGH SANDS OF DIFFERENT POROSITIES
Specific gravity of gas -.697 (Air=1)
Group-A, 48-65 Mesh Wilcox Sand, 2½ in flow tube
Curve 1, Porosity 32.36 Per Cent
" 2, " 33.41 " "
" 3, " 34.33 " "
" 4, " 34.87 " "
Group-B, 28-35 Mesh Building Sand, 3in flow tube
Curve 1, Porosity 36.51 Per Cent
" 2, " 38.44 " "
" 3, " 39.29 " "
" 4, " 39.86 " "
Group-C, 28-35 Mesh Ottawa Glass Sand, 3 in flow tube
Curve 1, Porosity 33.14 Per Cent
" 2, " 35.81 " "
Group A
Group B
Group C
1 2 3 4
1 2 3 4
1 2
100,000
10,000
1,000
DIFFERENCE OF SQUARES OF PRESSURES, LBS PER SQ IN. SQUARED
100
1,000
10,000
RATE OF GAS FLOW, THOUSANDS OF CU.FT. PER 24 HRS. PER SQ.FT. CROSS-SECTION

***FIGURE 5***

***Effect of porosity on flow of natural gas through porous media***

media, the lower part of curve 1 has a slope of 1.0 and the upper part of the same curve has a slope of 2.018. Further, for flow through any given sand there is a change in $a$ with each change in $n$. This type of equation gives a close approximation of the data for the range in type of flow covered by curve 6 when average values of $a$ and $n$ are chosen. But this same type of equation would not even approximate the data for the full range of flows given by curve 1. In order to approximate these data, several equations of the type indicated by equation 1 would have to be written, each covering a small portion of the curve. In other words, the type of flow does not change materially through the range shown by curve 6, whereas there is an appreciable change throughout the limits of curve 1.

An expression of the type given by equation 2 more nearly approximates the requirements of the data over the range in types of flow studied than a single expression of the type of equation 1. But this type of equation also has its limits of application. Equations may be written to satisfy three points over the range of each curve, but the intermediate points would be somewhat in error.

The third type of equation 3 fulfills the requirements of the data to a high degree of accuracy and is considered to be well within experimental error. It can be shown from the equations of this type, as given in Table 2, that for sufficiently small values of $Q$ the second term to the right of the equality becomes very small compared with the value of the first term and may be neglected. This leaves an equation which expresses the same relationship as Poiseuille's law.[9] Conversely, if the values of $Q$ are large, the first term may be neglected because of its relatively small value. The equation then takes on a form which approximates the relationship expressed by Fanning's[10] equation for turbulent flow of fluids through pipes. From this

TABLE 2.—*Empirical Equations of Type* $P_1^2 - P_2^2 = aQ + bQ^n$, *Determined from Curves in Figures* 4 *and* 5

PART 1.—FROM FIGURE 4.—EFFECT OF GRAIN DIAMETER AND GRAIN SURFACE ON RATE OF FLOW

| | Curve | Porous Material | Porosity | Equation[a] |
|---|---|---|---|---|
| | 1 | 120-170 Wilcox sand | 32.63 | $P_1^2 - P_2^2 = 13.4Q + 0.00521Q^{2.018}$ |
| | 2 | 48-65 Wilcox Sand | 32.09 | $P_1^2 - P_2^2 = 3.3Q + 0.00776Q^{1.888}$ |
| | 3 | 20-28 Ottawa sand | 31.43 | $P_1^2 - P_2^2 = 0.25Q + 0.00273Q^{1.840}$ |
| | 4 | No. 12 lead shot | 35.34 | $P_1^2 - P_2^2 = 0.03Q + 0.000498Q^{1.871}$ |
| | 5 | No. 5 lead shot | 34.67 | $P_1^2 - P_2^2 = 0.01Q + 0.000243Q^{1.883}$ |
| | 6 | No. 1 lead shot | 34.57 | $P_1^2 - P_2^2 = 0.005Q + 0.000172Q^{1.901}$ |

PART 2.—FROM FIGURE 5.—EFFECT OF POROSITY ON RATE OF FLOW

| Group | Curve | Porous Material | Porosity | Equation |
|---|---|---|---|---|
| A | 1 | 48-65 Wilcox sand | 32.36 | $P_1^2 - P_2^2 = 2.40Q + 0.01535Q^{1.797}$ |
| | 2 | | 33.41 | $P_1^2 - P_2^2 = 2.26Q + 0.01302Q^{1.796}$ |
| | 3 | | 34.33 | $P_1^2 - P_2^2 = 2.00Q + 0.01176Q^{1.798}$ |
| | 4 | | 34.87 | $P_1^2 - P_2^2 = 1.88Q + 0.01146Q^{1.796}$ |
| B | 1 | 28-35 building sand | 36.51 | $P_1^2 - P_2^2 = 1.80Q + 0.00686Q^{1.844}$ |
| | 2 | | 38.44 | $P_1^2 - P_2^2 = 1.30Q + 0.00650Q^{1.826}$ |
| | 3 | | 39.29 | $P_1^2 - P_2^2 = 1.24Q + 0.00531Q^{1.837}$ |
| | 4 | | 39.86[b] | $P_1^2 - P_2^2 = 0.55Q + 0.01129Q^{1.753}$ |
| C | 1 | 28-35 Ottawa sand | 33.14 | $P_1^2 - P_2^2 = 0.24Q + 0.00158Q^{1.831}$ |
| | 2 | | 35.81 | $P_1^2 - P_2^2 = 0.175Q + 0.00113Q^{1.834}$ |

[a] $P_1^2 - P_2^2$ = difference of squares of pressures per foot length, pounds per square inch squared.

$Q$ = rate of flow, thousands of cubic feet per 24 hr. per square foot cross-section.

$a$ $b$ and $n$ = experimental constants.

The numerical values for $a$ and $b$ were obtained by mathematics and analytical geometry in fitting the equation to empirical data. A helpful reference is J. Lipka: Graphical and Mechanical Computation, Ed. 1, 153. 1918.

[b] Questionable.

[9] E. Hatschek: The Viscosity of Liquids, 16-19. New York, 1928. D. Van Nostrand Co.

W. H. Walker, W. K. Lewis and W. H. McAdams: Principles of Chemical Engineering, Ed. 2, 74. New York, 1927. McGraw-Hill Book Co.

[10] W. H. Walker, W. K. Lewis and W. H. McAdams: Principles of Chemical Engineering, Ed. 2, 75, 110-111. New York, 1927. McGraw-Hill Book Co.

it may be concluded that the first term indicates the magnitude of the viscous flow component and the second term indicates the magnitude of the turbulent flow component in a rather intricate series of the two conditions of flow, viscous and turbulent.

### Factors Influencing Gas Flow Through Porous Media

At the present stage of the investigation it is impossible to state the quantitative effect of the sand characteristics on the flow of gases. However, from a summary examination of the eqautions given in Table 2, the effects of some of the factors, such as grain diameter, porosity and shape of grain, can be indicated qualitatively.

The equations in Table 2 for curves 4, 5 and 6, from Figure 4, show the effect of grain diameter on exponent $n$. Inasmuch as these equations are for the flow of gas through lead shot packed to approximately the same porosity, this is the only factor influencing the flow. The exponent $n$, increases with the diameter of the shot. From the trend indicated by curves 4, 5 and 6 it would be reasonable to expect the same trend for curves 1, 2 and 3 (Figure 4), which show the relationships for sands of different grain diameters. However, the trend for sand grains of different diameters is in the opposite direction from that indicated by the lead shot. That is, there is a noticeable decrease in the values of $n$ for increases in the diameter of the sand grain. This is due to the progressive increase in the angularity of the sand grains with decrease in sand-grain diameter. The change in angularity of the sand grains is quite apparent when the grains are viewed under a microscope. The relationships shown by the equations for curves 1, 2, 3, 4, 5 and 6 indicate that the angularity of the grains has a greater effect than the corresponding changes in grain diameter. It may be noticed also that there is apparently a consistent change in the ratio $a:b$ in the above equations with corresponding changes in the grain diameters. This relationship is a hyperbolic function of the grain diameter and is independent of the angularity of the grains.

The curves in Figure 5 show some of the effects of changes in porosity on the flow of natural gas through porous media, and the equations in Table 2 for these curves, although not entirely consistent, suggest that the porosity affects neither exponent $n$ nor the ratio $a:b$. However, porosity does cause a variation in the magnitude of $a$ and $b$. The variations in the exponent in the equations for group B, curves 1, 2, 3 and 4, is attributed to the angular character of the grains of the building sand. It is not possible at present to explain the difference in the exponents of group A and the exponent in the equation for curve 2 of Figure 4, except that the tests from which the data for group A were taken were made on a 2½-inch diameter tube as compared to a three-inch tube for the other tests.

### Relationship Between Friction Factor and Reynold's Criterion

In the course of the analysis of data some attempts were made to compare the flow of gas through porous media with the flow of gas through pipes. This led to a comparison of the relationship between the friction factor and Reynold's criterion[11] for flow of gas through porous media and that for flow of gas through pipes. The relationship for porous media is shown in Figure 6. There is not the abrupt break in the continuity of the curve shown in Figure 6 that occurs for the flow of gas through straight pipes. Recent experimental work of the Bureau of Mines[12] on the flow of gas through coiled tubes of capillary dimension shows a relationship similar to that in Figure 6.

As shown in Figure 6, both the friction factor, $R/SV^2$, and Reynold's criterion, $\frac{DVS}{Z}$, are dimensionless, that is, when values are substituted for the factors in each of the two expressions, the resultants are abstract numbers. The values of the friction factor and Reynold's criterion were obtained as follows. In the friction factor $\frac{R}{SV^2}$, $R = \frac{Dg \times (P_1 - P_2)}{4L}$, or the frictional resistance per unit of area of tube surface expressed in poundals per square foot.

$D$ = mean effective pore diameter, feet, obtained by using the equations given in Table 2 and by the use of Poiseuille's law.

$g$ = acceleration due to gravity, feet per second per second.

$P_1 - P_2$ = pressure differential, pounds per square foot.

$L$ = length of sand core, feet.

$S$ = mean density of gas, pounds per cubic foot, corrected for mean pressure and mean temperature.

$V$ = mean velocity of gas, feet per second, quantity of flow per second divided by effective area of cross sections, or

$$\frac{\text{(Quantity of flow per second)}}{\text{(Cross-sectional area of flow tube} \times \text{porosity)}}$$

corrected for pressure and temperature.

In Reynold's criterion, $\frac{DVS}{Z}$, $D$, $V$, and $S$ are the same as defined above.

$Z$ = absolute viscosity, pounds per second per foot.

"Mean effective pore diameter" ($D$), as given in the above equations for friction factor and Reynold's criterion, is taken to mean the equivalent diameter of a straight tube of capillary dimension, which will flow the same amount of gas under the same pressure conditions as will flow through the tortuous path of a single series of interconnected pores that extend to the limits of the sand. This definition is based upon a condition of viscous flow which definitely fixes its meaning. The authors are indebted to T. V. Moore, petroleum engineer of Humble Oil & Refining Company, for the suggestion of this term, which they have found very helpful in analyzing their flow-tube data. Work has not been carried far enough to indicate how the term may be applied to describe the sand condition now generally termed "permeability," where the flow is other than viscous.

As yet it is not apparent whether it is practicable to use the relationship between friction factor and Reynold's criterion in conjunction with Fanning's equation for the flow of fluids through pipes as a basis for comparing the capacities of various sands for gas flow. Data obtained from the flow of gas through four different sands were used in Figure 6. That these different sets of data so closely approximate one continuous smooth curve demonstrates impressively the consistency of the values obtained for mean effective pore diameter by using the equations given in Table 2 and the relationship for viscous flow expressed by Poiseuille's law. Also, the similarity that was apparent when the curve in Figure 6, which is the result of tortuous flow through porous media, was compared with that obtained from the flow of gas through a coiled tube suggests the possibility of relating the intricacies of the present problem to conditions of flow that are more thoroughly understood.

### Permeability

The difficulties confronting an accurate measurement of the relative capacity of any sand to allow gas to flow through it have been indicated. The term "permeability" has been generally used to designate a sand's capacity for the flow of fluids

[11] E. S. L. Beale and P. Coeksey: The Flow of Fluids in Pipes. **Jnl. Inst. Petr. Technologists** (1928) **14**, 236-59.

[12] T. W. Johnson and W. B. Berwald: Deviation of Natural Gas from Boyle's Law and Viscosity of Natural Gas. U. S. Bur. Mines **Tech. Paper**, to be published.

[13] C. F. Barb: Porosity-Permeability Relations in Appalachian Oil Sands; Proceedings of the First Petroleum and Natural-Gas Conference Held at the Pennsylvania State College, Oct. 24-25, 1930. The Pennsylvania State College **Bulletin**, Mineral Industries Experiment Station, **Bull. 9**, 48.

through it and is defined by Barb[12] as the rate of flow per unit cross-section per unit length per unit pressure drop. Such a unit may be readily understood and used as a basis of comparison for noncompressible fluids, and for compressible fluids when the pressure conditions and type of flow are also defined, but it does not in itself portray the true characteristic of the sand. As Muskat and Botset have shown, the permeability of a sand varies with each condition of flow and is not a fixed sand characteristic. It is a function of the porosity, the grain diameter and the shape of the grain as fixed characteristics of the sand, and is a function also of the flow condition which is variable and in turn influenced by the sand characteristics.

The mean effective pore diameter might be used to indicate the relative capacity of a sand to allow gas to flow through it, but, as previously stated, this method of comparison would definitely limit the comparison to viscous flow.

In the empirical equation of the form $P_1^2 - P_2^2 = aQ + bQ^n$ which it is believed best fits the data, there are three constants, $a$, $b$ and $n$, to be determined experimentally for each sand. It is only when the magnitude and interrelation of these three constants are considered that an accurate understanding may be had of a sand's capacity to allow gas to flow through it. When equations for a group of sands have the same value of $n$ it is then only necessary to consider the magnitude of $a$ and the ratio $a:b$. The smaller the value of $a$ and the smaller the ratio $a:b$, the more freely will gas flow through the sand. When the values of $n$ are not the same and $n$ must be considered, the larger the value of $n$, the greater the increase in pressure differential for a given increase in rate of flow. As stated previously, for very low rates of flow, the term $bQ^n$ may be neglected; and for extremely high rates of flow the term $aQ$ may be neglected.

## Summary

The problem of the flow of gas through porous media is not one that can be attacked readily from a purely analytical standpoint because of the obscurity of a number of the influencing factors. In view of the lack of data relating to the quantitative effects of the influencing conditions, the solution of the problem must be based upon experimental data. The data so far obtained on the problem by the Bureau of Mines indicates that an equation of the form $P_1^2 - P_2^2 = aQ + bQ^n$ best fulfills the requirements throughout the entire range of flow conditions. This equation represents the direct relationship between pressure conditions and rates of flow for any one particular sand, the constants $a$, $b$ and $n$ being determined experimentally. The equation, therefore, denotes the capacity of the sand to allow gas to flow through it. While the equation defines the relationship between pressure condition and rate of flow, it also affords an accurate means of studying the effects of such factors as grain size, grain shape and porosity upon the flow conditions for different sands. The effects of sand characteristics are indicated by the interrelationship of the constants $a$, $b$ and $n$. Under the conditions of the tests in this particular study, these effects were found to be as follows:

1. An increase in the diameter of grain, without change in the grain shape or angularity, tends to increase the value of the exponent $n$.

2. An increase in the angularity of sand grains tends to increase the value of the exponent $n$. From the data thus far studied, the effect of such increased angularity is more pronounced than the effect of changes in grain size.

3. An increase in the diameter of grain decreases the ratio $a:b$. Values of $a$ and $b$ for the equations representing the flow of gas through several different sands are given in Table 2, Part 1. If the values of the ratio $a:b$ are plotted against the corresponding grain diameters, Table 1, it will be found that $a:b$ is apparently a hyperbolic function of the grain diameter. This relationship is independent of the angularity of the grain.

4. A change in porosity does not change values of either the exponent $n$ or the ratio $a:b$; however, the actual magni-

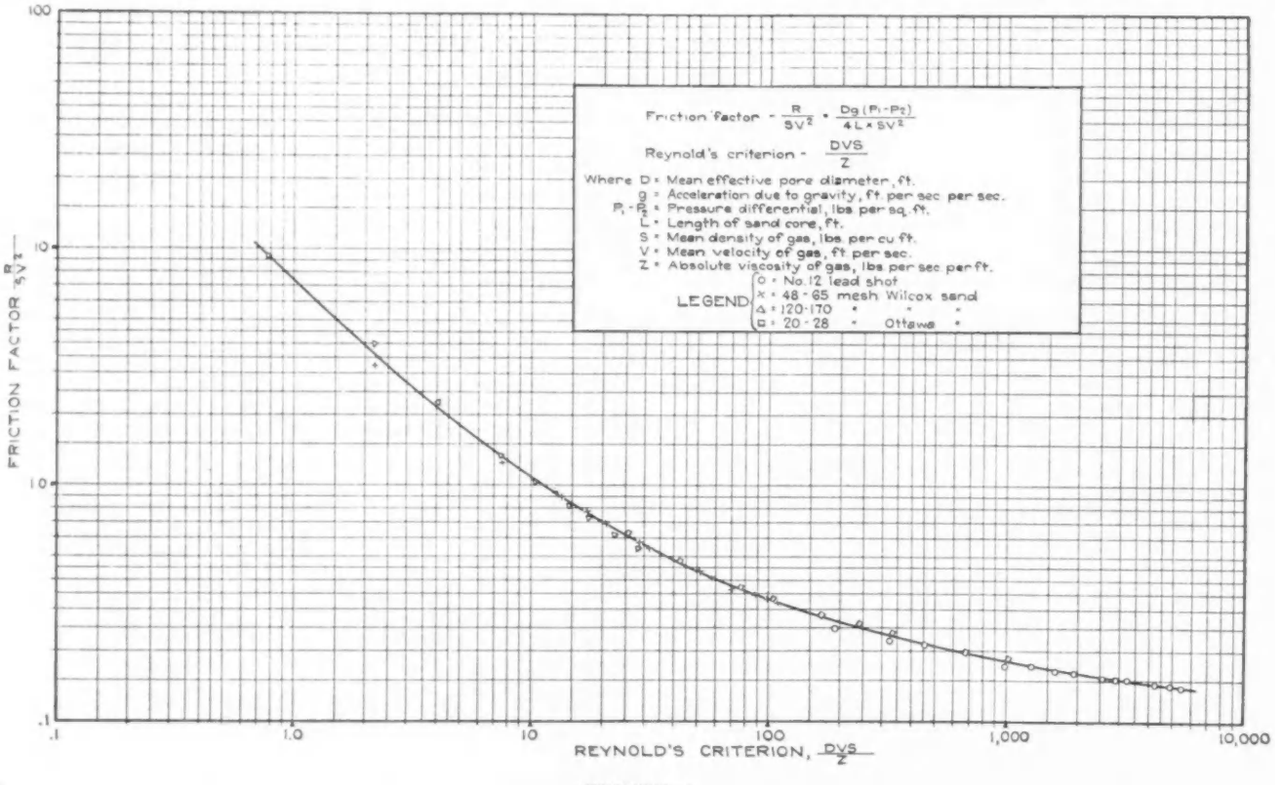
Friction factor = R/SV² = Dg(P₁-P₂)/4L×SV²
Reynold's criterion = DVS/Z
Where D = Mean effective pore diameter, ft.
g = Acceleration due to gravity, ft. per sec. per sec.
P₁-P₂ = Pressure differential, lbs. per sq. ft.
L = Length of sand core, ft.
S = Mean density of gas, lbs. per cu. ft.
V = Mean velocity of gas, ft. per sec.
Z = Absolute viscosity of gas, lbs. per sec. per ft.
LEGEND
○ = No. 12 lead shot
× = 48 - 65 mesh Wilcox sand
△ = 120-170 " " "
□ = 20 - 28 " Ottawa "
FRICTION FACTOR R/SV²
REYNOLD'S CRITERION, DVS/Z
100
10
1.0
.1
1.0
10
100
1,000
10,000

**FIGURE 6**
***Relation between friction factor and Reynold's criterion for flow of gas through porous media***

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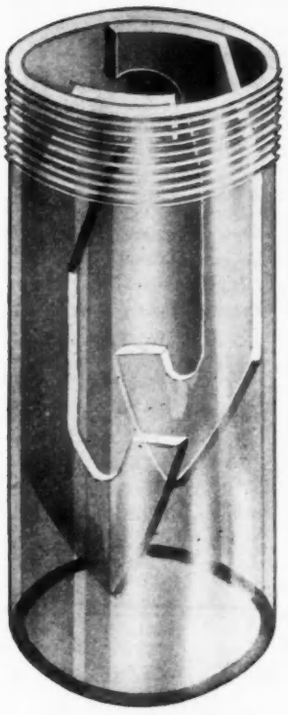

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tudes of $a$ and $b$ are not the same for different porosities. The relationship between friction factor and Reynold's criterion was used to test the consistency of the data obtained.

Other relationships brought out by the data were:

5. The adiabatic expansion of air flowing through sands produces a cooling which compares favorably with the Joule-Thompson effect. For similar pressure conditions, the amount of cooling is much greater for natural gas than for air.

6. For the rectilinear flow of gases through porous media, the pressure squared is a linear function of the distance of travel. This relationship leads to an equation for the mean pressure between any two points along a sand-filled tube,

$$P_m = \frac{2}{3}\left(P_1 + P_2 - \frac{P_1 P_2}{P_1 + P_2}\right)$$

which is identical with Weymouth's equation for the mean pressure in a pipe line operating under high differential pressures.

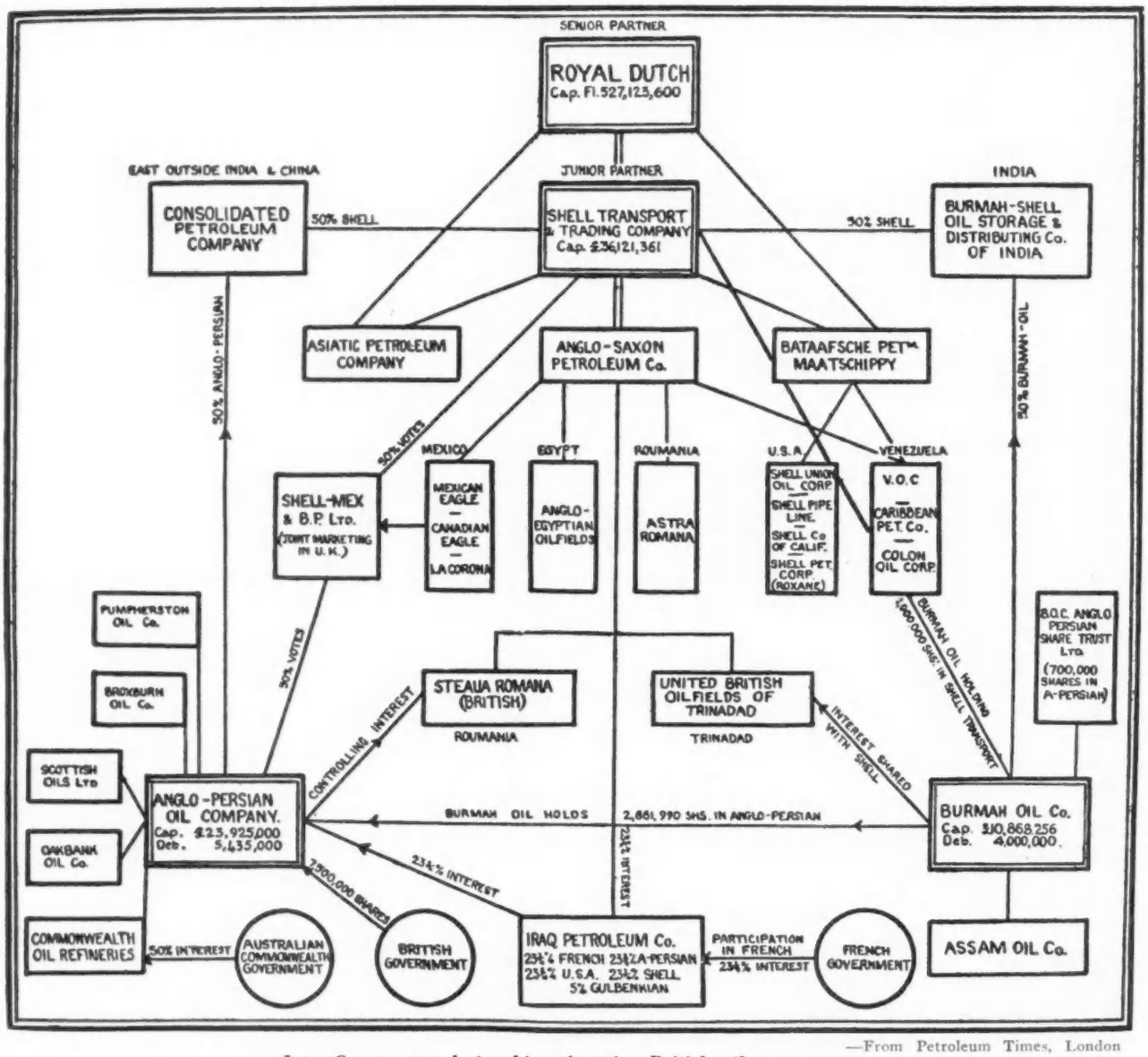

## Acknowledgment

Acknowledgment with thanks is made to the Canadian River Gas Company of Amarillo, Texas, for its support of this investigation by furnishing the necessary gas well and other facilities. Special thanks are due Mr. Max K. Watson of this company for his active co-operation and assistance. Messrs. T. V. Moore and Jack Horner of Humble Oil & Refining Company rendered assistance by suggesting methods for analysis of the data.

The writers wish to thank Messrs. H. C. Fowler, Ben E. Lindsly, G. B. Shea, T. W. Johnson, H. C. Miller, and Gustav Wade for constructive criticism of the manuscript.

Messrs. M. A. Schellhardt, W. B. Berwald, T. W. Johnson and Dale Nichols, of the Bureau of Mines staff, assisted in conducting the experiments.

The investigation is being carried on under the general supervision of Mr. H. C. Fowler, acting chief engineer, Petroleum and Natural Gas Division, U. S. Bureau of Mines, Washington, D. C., and Mr. N. A. C. Smith, supervising engineer, Petroleum Experiment Station, U. S. Bureau of Mines, Bartlesville, Oklahoma.


—From Petroleum Times, London

***Inter-Corporate relationship of major British oil companies***

# INTERNATIONAL PETROLEUM
## IN REVIEW

**ROY E. LEIGH, *Foreign Editor, New York***

### *Venezuelan Yields, Costs, and Profits*

Figures submitted to the ways and means committee of the Congress of the United States by Wirt Franklin, leading proponent of oil tariff legislation and ascribed to a competent authority having had personal experience in the refining of Venezuelan crude, quote a figure of less than seven-eighths of a cent per gallon as representing the cost of gasoline made from Venezuelan crude. The calculations which yielded this result, however, were based on values which no longer obtain. By substituting current quotations, it is possible, by the method there used, to arrive at a figure of 4.36 cents per gallon as approximating the net cost of gasoline made from Venezuelan crude, f.o.b. Atlantic ports.

Franklin's technical adviser was quoted as having said that "Tankers under American registry transport this crude for 14 cents per barrel, and foreign ships for 11 cents." Dawing on his own experience, and giving detailed figures to support his conclusions, this adviser estimated that the cost of refining Venezuelan crude averages 20.99 cents per barrel. Accepting the tariff commission's figure of 62 cents per barrel as representing the value of crude f.o.b. Venezuelan terminal, a total of 96.99 cents per barrel was established as representing the cost of producing, shipping, and refining an average barrel of Venezuelan crude.

Substituting present-day values for the figures reported by the tariff commission, it is found that the proceeds from the sale of the derivatives of such a barrel of crude would be approximately as follows:

| | |
|---|---|
| Gasoline 42 x .30* x 5¾† = ..... | $0.7245 |
| Fuel Oil and Gas‡, .70* x 60 cents† = ..... | .42 |
| Total Yield ..... | $1.1445 |
| Less Cost, as indicated above ..... | .9699 |
| Net Profit, per barrel ..... | .1746 |

This figure of approximately 17½ cents per barrel, plus any profits which may be realized in producing Venezulean crude for less than 62 cents per barrel, the tariff commission's figure, may therefore be taken as indicative of current profits from Venezulean oil operations.

*"The cracking operation increases the unit volume sufficiently to compensate for losses in normal refinery practice, so that the total recovery is 100 per cent, and the finished products consist of approximately 30 per cent of gasoline and 70 per cent of fuel oil and gas."

‡New York Harbor prices on U. S. Motor gasoline, below 65 octane number, and Grade C bunker fuel.

†"Since gas is credited with full fuel value, the gas and fuel oil will be considered together in calculating costs and yields . . ."

### *Two New Wells In Germany*

Reports from Germany bring news of the completion of two new wells by the Ebag company, near Celle, in the province of Hanover, which have an aggregate output of approximately 350 barrels per day. Their especial significance is that they serve to join the eastern and northern parts of the new Oberg field, which thus takes on the dimensions of an important oil field.

It is stated also that the Deutsche Petroleum Aktien-Gesellschaft is planning to abandon its deep test at Wietse, which is still drilling well below 5000 feet.

The new refinery at Misberg, which was built by Arthur G. McKee & Company, of Cleveland, for the joint account of the Preussag and Elwerath companies, was placed in commission on February 10.

Current dispatches also bring reports of a fire in the underground workings of the Burbach Potash Company, at Volkenroda, in Thuringia, where oil and potash were both being produced by mining.

### *Iraq*

"Oil and gas in Iraq has been a matter of record for more than 5000 years. The early Sumarians at Ur of the Chaldees used bitumen from the seepages. The Bible records the 'burning bush,' 'eternal fires,' etc.

" . . . Oil at Qaiyarah occurs 700-1100 feet below the surface, at Kirkuk 1250-3500 feet, and at Naft Khaneh 3000 feet and deeper. In other structures of oil promise, which are as yet unproved, depths will range from a few hundred feet to depths beyond the present limit of the drill. Qaiyarah crude is similar in some respects to heavy Mexican crude. Kirkuk crude averages 35.7 degrees A. P. I., has a mixed base, is sulphurous, and is, in many respects, similar to Mid-Continent crudes of similar gravity. Kirkuk and Qaiyarah wells flow under moderately low pressures, (less than 200 pounds per square inch at casing head), but Naft Khaneh wells flow under as high a pressure as 1800 pounds per square inch at casing head.

"Up to December 31, 1931, Iraq Petroleum Company, Ltd., had drilled tests in 10 different areas and had discovered one commercial field. Most of the company's operations outside of Kirkuk and Qaiyarah have met with an unprecedented combination of mechanical drilling difficulties, including extremely high fluid pressures. One well had a reported water flow above objective of 120,000 barrels per day with a flowing pressure of 1300 pounds per square inch and a closed in pressure which momentarily rose above 2500 pounds. Heaving, caving, squeezing, and in some cases flowing manjak accompany and complicate the pressure flows. Formation movements of different

**Production of Oil in Trinidad During 1931**

| Company | Daily Average of November and December, 1931 Bbl. | Total 1931, Bbl. |
|---|---|---|
| Apex Oilfields, Ltd. | 10,540 | 3,847,111 |
| Trinidad Leaseholds, Ltd. | 4,063 | 1,483,140 |
| British Controlled Oilfields | 4,038 | 1,473,911 |
| United British | 3,162 | 1,154,217 |
| Kern Trinidad Oilfields, Ltd. | 1,159 | 424,040 |
| Others | 1,070 | 390,287 |
| General Asphalt | 992 | 363,038 |
| Siparia Oilfields, Ltd. | 894 | 326,379 |
| Trinidad Oilfields, Ltd. | 843 | 307,664 |
| Trinidad Central Oilfields, Ltd. | 236 | 86,189 |
| | 26,997 | 9,853,976 |

—From paper by W. J. Millard, Consulting Geologist, of Huntley & Huntley, Pittsburgh, read before the Petroleum Division of the American Institute of Mining and Metallurgical Engineers, New York, February, 1932.

types have caused a large percentage of junked holes. The difficulties are confined for the most part to the asymmetrical fold-faulted structures located in the southern areas. So far, except at Naft Khaneh where conditions are not quite so extreme, no test has completely penetrated the 1000 to 2000 feet of difficult drilling in the pressure districts. It is needless to say that such difficulties have greatly slowed up operations and greatly increased the cost of exploration in Iraq. During 1929-31, drilling operations were suspended at Naft Khaneh (A. P. O. C.) pending the building of a pipe line to the Mediterranean . . .

" . . . Developments at Kirkuk now call for the construction of an 84,000-barrel pipe line to the Mediterranean. Surveys on that project are nearing completion and it is anticipated that construction will be finished some time before the end of 1935."

—Ben B. Cox, *Geologist, Near East Development Corporation, New York.*

## *Roumania*

The high estimate of probable oil reserves in the Aricesti field is based on a recent discovery well drilled by the Steaua Romana which encountered oil in the Meotic. Like Boldesti, Arcesti has been considered chiefly as a gas field for many years. The discovery of oil in Boldesti and Aricesti not only reveals large reserves in these fields but also shows the great possibilities of finding oil in the numerous folds occurring all along the outer edge of the sub-Carpathian region.

### Estimated Oil Reserves[1]

| Field— | Probable Acreage Dacic | Meotic | Estimated Production Thousands of Barrels Dacic | Meotic |
|---|---|---|---|---|
| Moreni | 770 | 1,540 | 5,550 | 29,600 |
| Piscuri | 154 | 440 | 5,920 | 13,320 |
| Gura Ocnitei | 264 | 1,320 | 33,300 | 53,280 |
| Valea Salciesului | ... | 220 | ... | 13,320 |
| Ochiuri | 330 | 880 | 3,330 | 13,320 |
| Baicoi-Liliesti-Tintea | 440 | 1,320 | 6,660 | 22,200 |
| Boldesti | ... | 4,400 | ... | 207,200 |
| Ceptura-Orzoaia | ... | 440 | ... | 9,620 |
| Filipesti | ... | 1,100 | ... | 19,240 |
| Cervenia | ... | 220 | ... | 3,700 |
| Floresti | ... | 440 | ... | 14,800 |
| Doicesti | ... | 1,760 | ... | 23,460 |
| Aricesti | ... | 3,740 | ... | 125,800 |
| Schiau-Valea Calugaresasca | ... | 2,640 | ... | 62,160 |
| Calinesti | ... | 1,100 | ... | 18,500 |
| Margineni | ... | 3,300 | ... | 71,040 |
| Bucsani | ... | 3,300 | ... | 66,660 |
| Total | 1,958 | 28,160 | 54,760 | 767,400 |

[1]By Dr. V. Patriciu: Contributions to the Evaluation of Oil Deposits (in French). **Ann. des Mines de Roumanie** (1931) **14**, 11.

### Drilling

The development of the Meotic pays in Moreni, Gura-Ocnitza and Boldesti fields has necessarily brought about the exclusive use of rotary tools, because of the high gas pressure in these fields.

The casing program, which in past years has been so complex (the completion of a shallow Dacic well requiring at least four strings of casing), in recent years has been simplified to a point where it may prove detrimental to to future development. For instance, in Boldesti, Steaua Romana has completed a well to 5800 feet in the Meotic with only one combination oil and water string, the casing being cemented above the pay through perforations. Operators in the United States have doubted the advisability of using a combination string except in emergency cases. The use of modern equipment and limited casing have cut down the cost of a well to about $11 per foot for a 6000-foot well. This cost was about three times greater in 1925. The cost of production has also come down from 6 cents in 1921 to 33 cents in 1925 and finally to 22 cents in 1931. In Baicoi Romano-Americana has installed a central power unit from which all of its shallow Dacic production is handled. This feature might not seem unique in the United States but it shows a remarkable step forward in Roumanian production practices, which not very long ago consisted of bailing and swabbing. Compression plants and gas-lift operations are being used successfully in several fields.

### Economics

Overproduction, taxes and Russian competition have hit the Rumanian oil industry hard.

Table below[2] shows strikingly the relationship of the actual market value of the various oil products to the tax levied on them. It is not surprising, after examining these figures, to learn that some operators in Rumania are burning or else throwing away the fuel oil.

[2]M. G. Procopiu: Some observations on the Crisis in the Petroleum Industry (in French). **Ann. des Mines de Roumania** (1931) 14, 9, 375-378.

### Taxes and Market Value

| Product | Value per Barrel F.o.b. | Total Taxes per Barrel |
|---|---|---|
| Light gasoline | $1.42 | $0.53 |
| Heavy gasoline | 0.57 | 0.52 |
| Kerosene | 0.39 | 0.28 |
| Motor oil | 0.34 | 0.34 |
| Fuel oil (light) | 0.20 | 0.29 |
| Fuel oil (heavy) | 0.03 | 0.29 |

The internal consumption of Rumania is small and 75 per cent of its output has to be marketed at any cost, resulting in such specatcular effects as the recent dumping of gasoline at Detroit and Baltimore. It is also obvious that this situation cannot keep up, since producers are operating at a loss. Again, the drilling of new wells has come to a low point, but whether it is only a seasonal fluctuation, as in the fall of 1930, is hard to foretell. It is unfortunate that the Rumanian government, which in 1919 acquired the subsurface rights of the undeveloped land for the good of the country, apparently has not succeeded in bringing about an effective plan of production curtailment. The conservation of a resource so vital to the country is especially important because of limited coal deposits.

—Dr. Ionel I. Gardescu, *Geologist and Petroleum Engineer, Oil & Gas Department, University of Pittsburgh.*

## *Russia*

There has been a steady increase in production since 1920, and with the improved drilling equipment and improved methods it will increase as long as the now proven fields continue to produce new wells. The fields of Baku and Grozny have yielded 95 per cent of this production. The Cara Chukur field, which is being developed at the present time, is an extension of the Surakany at Baku and may be considered a part of the old field. New fields are being developed as rapidly as possible. This work is slow, because transportation of heavy equipment is difficult. Many places are not near the railroads, and roads must be built.

The lack of organization in building derricks and drilling the wells delays progress. The reluctance to take responsibility in bringing in a new field delays decisions and work. All the work of this kind is done through orders from Moscow and all the employees are responsible to the government.

Wastes in production and storage also have greatly de-

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creased the ultimate yield of the fields. Haste to fulfill monthly quotas leads to the bringing in of big wells without storage or transportation facilities. High-gravity crude is stored in large earthen reservoirs where losses by evaporation are extremely high.

The Baku fields alone, if developed systematically—conserving the gas energies and using more gas and air-lifts, controlling the flooding by water, repressuring, and decreasing wastes by evaporation, emulsions and proper storage—would increase production and postpone the development of new fields.

The Grozny field has shown rapid improvement in production methods and in the conservation and use of natural gas. The Maikop field, situated near the Black Sea, which is one of the main transportation routes, is one of the future fields.

It will be necessary to open up new fields or drill deeper and produce more efficiently, if the proposed production program is to be carried out . . .

Russia's yearly refinery capacity as of August 1, 1931, is reported to be 156,000,000 barrels. Its production is steadily increasing; its proven fields are rapidly being drained as 95 per cent of the petroleum is taken rom these fields.

The new field looks favorable but development of a field in Russia is very different from similar operations in America. The oil trust manufactures its own equipment, does its own construction, drills its own wells, has its own storage and transportation to build and maintain, provides houses and even cities for its employees, provides transportation for its labor, as well as hospitals, clubs and rest homes.

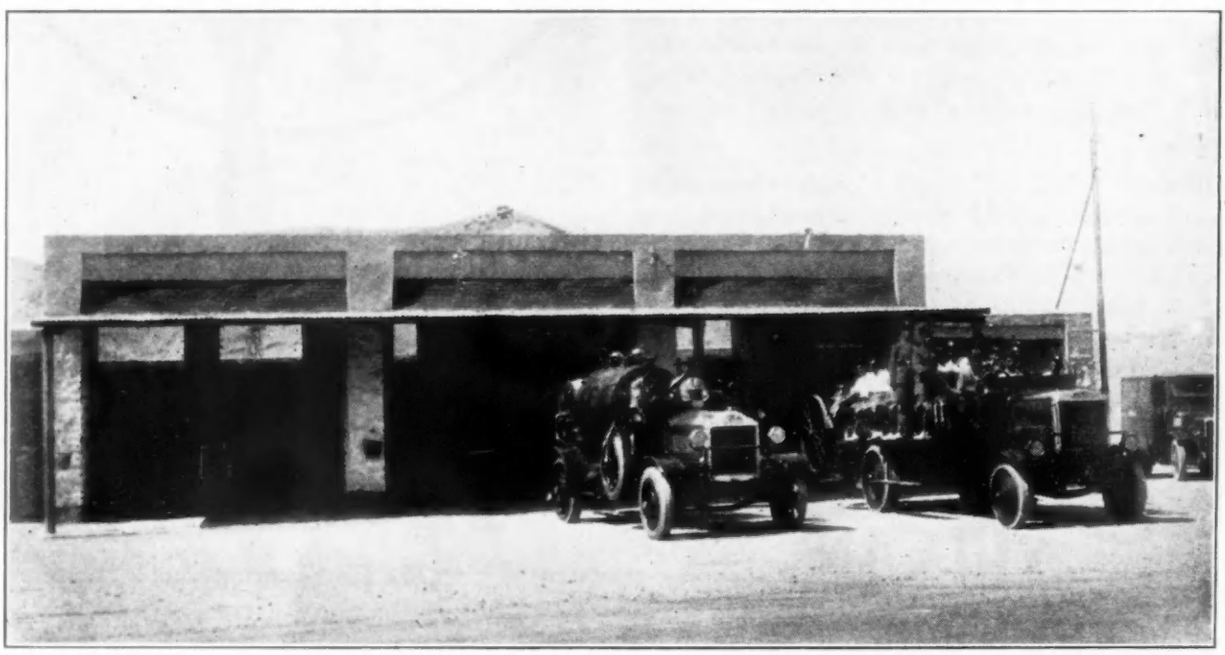
This multiplicity of duties naturally slows down the work, especially when the departments are more or less independent of one another but at the same time dependent upon the physical equipment each must furnish the other. Many times drilling must cease because the casing has not been delivered, or the cement was sent to another field, or the motor has failed to arrive. There is a shortage of tools, casing, cement; in fact, of everything. This enormous program causes confusion, the garbling of orders, the careless handling of equipment by unskilled hands. But regardless of its almost impenetrable fog of red tape, its unskilled labor, its shortage of everything but reports, Russia has become the second oil producer in the world and an extremely important factor in the oil markets. Nature certainly has placed her oil in the most accessible locations and Russia is taking advantage of it.

—Robert C. Beckstrom, *Consulting Petroleum Engineer, Tulsa, Oklahoma.*

### *Drilling Machinery Market in Germany*

German oil exploitation has more than doubled since the war and extensive drilling of oil has been done during the past few years. Recent successes are likely to lead to considerable increased drilling activity in the near future, according to a report by Consul G. L. Brandt, of Cologne, Germany. Some drilling has been started recently in Mecklenberg and in the neighborhood of Heide, in Schleswig Holstein. By far the greater drilling activity, however, is being carried on in the province of Hanover.

Both stationary and portable drilling equipment is used in Germany, while both percussion and rotary drilling is done. Except where very deep drilling is being carried on, however, the portable equipment appears to be preferred. Investigation also shows that the percussion method of drilling is prevalent to a greater extent than rotary drilling. Only four rotary drilling rigs are now operating in the province of Hanover, while about twelve other rotary rigs are said to be in operation in all of Germany. It is also stated that Germany manufactures a considerable volume of drilling machinery and has been enjoying a fairly large volume of foreign trade in this line. Russia is the principal buyer of German drilling equipment however, the bulk of equipment purchased by Germany from other countries comes from manufacturers in the United States.



*Anglo-Persian Oil Company's "Fields" Fire Department, Masjid-i-Suleiman, Persia*

# Markets • Production • Crude Prices

**H. J. STRUTH,** ***Staff Economist, Houston, Texas***

## Oklahoma and Texas Invert Production Curve

Increased production in Oklahoma and Texas was responsible for inversion of the national production curve last week. Daily average production of the United States was estimated by the American Petroleum Institute at 2,138,050 barrels, an increase of 30,000 barrels over the preceding week. Oklahoma reported a gain of 17,750 barrels a day while Texas registered an increase of 24,150 barrels daily. These gains were partially offset, however, by decreased production of 5450 barrels in the Gulf Coast and 8100 barrels in California.

East Texas reported an upturn in production last week of about 25,000 barrels a day, brought about principally by a slight gain in average well output as a result of abandonment of the Sunday shut-down. At the same time, completion of additional wells influenced an upward trend in output of East Texas field. Production of the field last week averaged 304,750 barrels daily, compared with 279,050 barrels in the preceding week. Under the present scheme of proration in force in East Texas, it is to be expected that there will be a gradual increase each week until March 15, when the Texas Railroad Commission will place into effect a limit of 325,000 barrels a day for the field. With new wells coming in at a rate of more than 80 a week, it is obvious that the limit of 75 barrels per well has failed to retard new developments. Despite the granting of injunctions against martial law in East Texas, it appears improbable that this field will again reach the competitive stages of last year. Judging from sentiment expressed by many operators there, it is likely that continued conservative development and operation will dominate. Besides, unless the legality of the state to regulate production is challenged in the courts, there appears ample assurance against the possibility of another orgy of wide-open production in East Texas. In the background, a majority of East Texas operators realize the folly of ignoring the laws of nature and of economics.*

Oklahoma production apparently exceeded market requirements again last week, when state output rose to 431,900 barrels. This rate of production is about 21,000 barrels a day more than the allowable and about 56,000 barrels more than recent average market requirements have indicated. However, the upturn in buying of Oklahoma crude manifested during the week ending February 20 is undoubtedly having some influence upon operators at Oklahoma City and Seminole. Oklahoma refineries have shown a tendency to increase still runs and shipments to the Indiana-Illinois refining area have also increased. Nevertheless, the increased takings can only be attributed to artificial demand. The fact remains that still runs have been excessive and gasoline stocks have mounted to a point considerably above normal working stocks. It is believed, therefore, that a higher rate of crude production is not justified and that any increase in demand is only of a temporary nature.

California recorded a decline of 8100 barrels a day last week, bringing the state total back to a point slightly below 500,000 barrels a day. No end of difficulty seems to have been encountered in California in an effort to reduce output to 456,000 barrels. In the meantime, stocks of crude are mounting on the Pacific Coast and every excuse for delay in adhering to the limitation set by the proration body is tending to weaken the California market structure.

Texas has succeeded in bringing production into line with indicated allowable, even though market requirements have been consistently above that figure. Last week, Texas production aggregated 817,550 barrels a day, as compared with an allowable of approximately 818,000 barrels and a market demand of 840,000 barrels. Where Texas was formerly the chief obstacle to a balanced supply situation, it has become the model of effectively controlled supply. Oklahoma, Kansas, California are now in the excess production class and are piling up stocks to the detriment of the industry. When the official figures for January and February are obtained, it is certain that they will show Texas in a favorable light and California, Oklahoma and Kansas as unfavorable. California will undoubtedly make the worst showing in the Bureau of Mines report, since production there has been persistently in excess of market requirements.

## Gasoline Stocks Reflect Demand Slump

Gasoline stocks reported to the American Petroleum Institute last week aggregated 45,567,000 barrels, an increase over the preceding week of 1,775,000 barrels. This sharp increase in stocks is assumed to reflect a slump in demand, particularly in view of the fact that runs to stills were reduced last week to the extent of 52,000 barrels a day. Runs to stills were reported at a total of 2,143,000 barrels daily, against 2,190,000 barrels in the preceding week. On a Bureau of Mines' basis, runs last week averaged about 2,227,000 barrels a day, whereas the indicated normal rate of throughput is but 2,085,000 barrels.

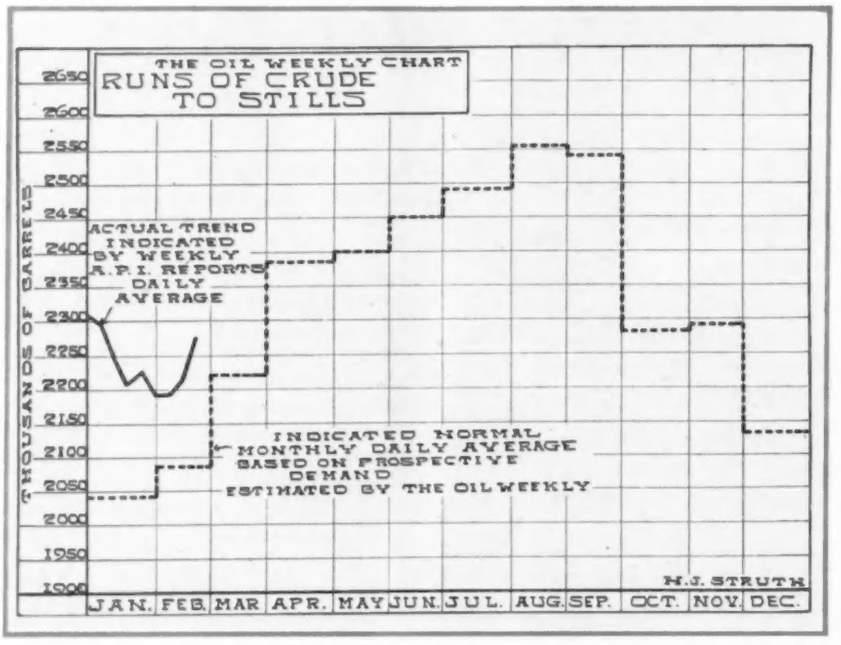
Normal stocks of gasoline at the end of February, as predetermined by the Economics Committee of the A. P. I., should not have exceeded 42,200,000 barrels. Converted to a Bureau of Mines' basis, last week's reported gasoline stock total becomes 47,300,000 barrels. This indicates that refinery gasoline stocks are now over 5,000,000 barrels in excess of normal working stocks. With the prospect of a gradual seasonal increase in demand, refiners are in a position to quickly correct their top-heavy situation by keeping still runs schedules at or below their present level through March and April. Only by doing so can refiners improve their supply situation before the season of peak demand is at hand.

## California Stocks Still Increase; Curtailment Apparently at Bottom

Although it has been estimated that California production should be brought down to 456,700 barrels to prevent an increase in stocks, some intermediate figure between the present output of 505,000 barrels and the suggested lower allowable probably would at least check the upward climb of stocks during the year. Small increases in stocks were recorded during both December and January, but a production of 456,700 barrels would have reduced stocks slightly.

No method for forcing production down to the basic al-

*Opposition to this proration, active and passive, is developing, however. See Page 11.




lowable has been suggested, and it now looks as if the output will go along at about the present level, which is more than 40,000 barrels too high. Some of the field, particularly Long Beach and Playa del Rey are above their allowables, but operators in these fields are sensitive and do not want to reduce further.

The increased consumption of third grade, or so-called second quality gasoline, has affected the crude market. Gasoline requirements have been based largely on the crude market, and the increase in the sale of very low price gasoline has caused the refiners to frown on high price charging stock.

Very heavy crude oil, which contains little gasoline on a straight run basis, may find a better market if cracking operations continue to increase. It has been found that the heavier grades of crude make gasoline with a high octane rating, while much of the high graivty crude yields gasoline with a low rating, when made by straight run methods. The producer of heavy oil feels that cracking may help to solve his problem. On the other hand, the heavier fractions from the light oil make desirable gasoline when cracked, and the heavy oil again finds competition.

Shipments to Japan have not been as large as rumored. The Japanese government was not short-sighted enough to

## Crude Runs to Stills, Gasoline Stocks and Gas and Fuel Oil Stocks

Report for Week Ending February 20, 1932
(Figures in barrels of 42 gallons)

| District | Potential Cap. (Daily) Total | Potential Cap. (Daily) Reporting | Per Cent | Crude Runs to Stills Total | Crude Runs to Stills Daily Average | Crude Runs to Stills Per c't Operated | Gasoline Stocks (see note below) | Gas & FuelOil Stocks |
|---|---|---|---|---|---|---|---|---|
| East Coast | 633,700 | 633,700 | 100.0 | 3,136,000 | 448,000 | 70.7 | 5,923,000 | 6,881,000 |
| Appalachian | 149,600 | 137,400 | 91.8 | 646,000 | 92,300 | 67.2 | 1,718,000 | 1,183,000 |
| Ind., Ill., Ky. | 436,300 | 431,500 | 98.9 | 1,958,000 | 279,700 | 64.8 | 5,448,000 | 4,756,000 |
| Okla., Kans., Mo. | 485,700 | 435,200 | 89.6 | 1,545,000 | 220,700 | 50.7 | 3,877,000 | 3,351,000 |
| Texas | 838,200 | 765,400 | 91.3 | 3,544,000 | 506,300 | 66.1 | 9,200,000 | 10,420,000 |
| Louisiana-Arkansas | 233,100 | 230,500 | 98.9 | 1,065,000 | 152,100 | 66.0 | 1,460,000 | 3,925,000 |
| Rocky Mountain | 160,900 | 143,800 | 89.4 | 262,000 | 37,400 | 26.0 | 2,007,000 | 702,000 |
| California | 914,500 | 888,100 | 97.1 | 3,177,000 | 453,900 | 51.1 | 14,159,000 | 95,991,000 |
| Total Feb. 20 | 3,852,000 | 3,665,600 | 95.2 | 15,333,000 | 2,190,400 | 59.8 | 43,792,000 | 127,209,000 |
| Total Feb. 13 | 3,852,000 | 3,665,600 | 95.2 | 14,902,000 | 2,128,900 | 58.1 | 43,430,000 | 128,225,000 |
| Total Feb. 21, 1931 | 3,730,100 | 3,571,200 | 95.7 | 15,893,000 | 2,270,400 | 63.6 | *42,821,000 | 129,072,000 |
| **The Texas and Louisiana Gulf Coastal figures shown below are included above in the totals of their respective districts.** | | | | | | | | |
| Texas Gulf Coast | 532,500 | 531,500 | 99.8 | 2,671,000 | 381,600 | 71.8 | 7,300,000 | 7,606,000 |
| La. Gulf Coast | 147,500 | 147,500 | 100.0 | 797,000 | 113,900 | 77.2 | 1,305,000 | 3,138,000 |

NOTE: Stocks at refineries, except in California district, which includes stocks of finished gasoline and engine distillate at refineries, water terminals and sales distributing stations and amounts in transit thereto.

*This figure is not entirely comparable with current stocks due to revisions made since original publication of this figure, for which revisions the basic information is not available by weeks. If it were possible to have made the revision, the new figure would reflect somewhat lower stocks.

## HOW LAST WEEK'S DAILY AVERAGE PRODUCTION COMPARES WITH ALLOWABLE QUOTAS AND CURRENT DEMAND

| State— | Allowable or Economic Limit | Indicated Current Demand | Daily Average Last Week | Added to or Withdrawn from Storage (Estimated) | Daily Average Since Jan. 1 | Indicated Excess or Shortage Since Jan. 1 (Cumulative) |
|---|---|---|---|---|---|---|
| Arkansas | 38,000[1] | 43,000 | 33,850 | —9,150 | 33,953 | —524,700 |
| California | 456,000[2] | 465,000 | 499,200 | +34,200 | 504,334 | +2,281,400 |
| Kansas | 90,000[1] | 92,000 | 100,250 | +8,250 | 99,275 | +422,000 |
| Louisiana | 54,000[1] | 63,000 | 54,350 | —8,650 | 56,854 | —356,450 |
| Oklahoma | 410,000[3] | 375,000 | 431,900 | +56,900 | 426,715 | +558,800 |
| Texas | 818,000[1] | 840,000 | 817,550 | —22,450 | 838,752 | —72,850 |
| Balance of U. S. | 202,000[1] | 206,000 | 200,950 | —5,050 | 203,972 | —57,500 |
| Total | 2,068,000 | 2,084,000 | 2,138,050 | +54,050 | 2,163,855 | +2,250,700 |

[1]Economic Limit Based on Data Compiled by The Oil Weekly.
[2]Allowable set by California Proration Committee.
[3]Allowable set by Oklahoma Corporation Commission.

be caught with low petroleum stocks. Exports to Japan have been fairly steady for two or three years.*

As soon as there is a genuine demand for all of the current production of crude, an increase in wildcatting may be expected in California. This may come with the late spring, or it may be later. Conditions in other parts of the world will help to determine the course taken by the average major operator.

*See page 9.

## Gasoline Price Improvement Expected

With wholesale gasoline prices at or near the low levels of last year, there has been increasing skepticism over the outlook for the crude market. U. S. motor prices in Group 3 have receded to around 2⅞ cents a gallon, while crude prices have remained constant at 77 cents a barrel for 36 gravity oil. The history of 1931 shows that when U. S. motor gasoline was down to 3½ cents, crude prices were reduced to 59 cents a barrel;

## Cracked Gasoline Production

Report for Week Ending Feb. 20, 1932

(Barrels of 42 gallons)

| | Potential Charging Capacity | | | Production | |
|---|---|---|---|---|---|
| | Total | Daily Reporting | % | Total | Daily Average |
| East Coast | 261,300 | 236,300 | 94.1 | 631,000 | 90,100 |
| Appalachian | 56,300 | 54,100 | 96.1 | 164,000 | 23,400 |
| Ind., Ill., Ky. | 330,400 | 315,400 | 95.5 | 520,000 | 74,300 |
| Okla., Kans., Mo. | 237,800 | 219,500 | 92.3 | 341,000 | 48,700 |
| Texas | 450,800 | 436,200 | 96.8 | 869,000 | 124,100 |
| Louisiana-Arkansas | 112,400 | 112,400 | 100.0 | 207,000 | 29,600 |
| Rocky Mountain | 99,900 | 98,400 | 98.5 | 78,000 | 11,200 |
| California | 190,800 | 190,800 | 100.0 | 366,000 | 52,300 |
| Total Feb. 20 | 1,739,700 | 1,663,100 | 95.6 | 3,176,000 | 453,700 |
| Total Feb. 13 | 1,739,700 | 1,663,100 | 95.6 | 3,196,000 | 456,600 |
| Total Feb. 21, 1931 | 1,589,600 | 1,505,500 | 94.7 | 2,753,000 | 393,300 |
| **The Texas and Louisiana Gulf Coastal figures shown below are included above in the totals of their respective districts.** | | | | | |
| Texas Gulf Coast | 352,400 | 347,400 | 98.6 | 717,000 | 102,400 |
| La. Gulf Coast | 77,000 | 77,000 | 100.0 | 149,000 | 21,300 |

## Imports of Petroleum

(Barrels of 42 gallons)

| | Week Ended Feb. 20 | Week Ended Feb. 13 |
|---|---|---|
| AT ATLANTIC COAST PORTS— | | |
| Baltimore | 218,000 | 359,000 |
| Boston | 196,000 | 62,000 |
| New York | 831,000 | *534,000 |
| Philadelphia | 314,000 | 155,000 |
| Others | 222,000 | *272,000 |
| Total | 1,781,000 | 1,382,000 |
| Daily Average | 254,429 | 197,429 |
| AT GULF COAST PORTS— | | |
| Galveston District | ..... | ..... |
| New Orleans and Baton Rouge | ..... | 21,000 |
| Port Arthur and Sabine District | ..... | ..... |
| Tampa | ..... | ..... |
| Total | ..... | 21,000 |
| Daily Average | ..... | 3,000 |
| AT ALL UNITED STATES PORTS— | | |
| Total | 1,781,000 | 1,403,000 |
| Daily Average | 254,429 | 200,429 |
| Daily Average Four Weeks Ended | 219,857 | 216,607 |
| **Distribution of Total Imports is as follows:** | | |
| Crude | 1,059,000 | 683,000 |
| Gasoline | 68,000 | *349,000 |
| Kerosene | ..... | 4,000 |
| Fuel Oil | 654,000 | *367,000 |
| Total | 1,781,000 | 1,403,000 |

## California Oil Receipts

(Barrels of 42 gallons)

| | Week Ended Feb. 20 | Week Ended Feb. 13 |
|---|---|---|
| AT ATLANTIC COAST PORTS— | | |
| Baltimore | 41,000 | ..... |
| Boston | ..... | ..... |
| New York | ..... | *105,000 |
| Philadelphia | 141,000 | ..... |
| Others | ..... | ..... |
| Total | 182,000 | 105,000 |
| Daily Average | 26,000 | 15,000 |
| AT GULF COAST PORTS— | | |
| Total | ..... | *72,000 |
| Daily Average | ..... | 10,286 |
| AT ATLANTIC AND GULF COAST PORTS— | | |
| Total | 182,000 | 177,000 |
| Daily Average | 26,000 | 25,286 |
| Daily Average Four Weeks Ended | 19,893 | 27,714 |
| **Distribution of Total California Oil Receipts is as follows:** | | |
| AT ATLANTIC COAST PORTS— | | |
| Gasoline | 182,000 | *105,000 |
| Total | 182,000 | 105,000 |
| AT GULF COAST PORTS— | | |
| Gasoline | ..... | *72,000 |
| Total | ..... | 72,000 |

*—Revised.

## United States Daily Average Production

| 1930 | Oklahoma | Kansas | Texas (Outside Gulf Coast) | Gulf Coast | North Louisiana | Arkansas | Eastern States | Rocky Mountain | California | United States Daily Av. | United States Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| September . . | 558,900 | 116,550 | 606,550 | 200,750 | 40,150 | 53,550 | 121,400 | 110,650 | 604,900 | 2,413,400 | 72,402,205 |
| October . . . | 542,100 | 114,850 | 609,500 | 194,850 | 41,500 | 52,800 | 121,750 | 104,000 | 590,800 | 2,372,150 | 73,536,350 |
| November . . | 491,550 | 111,400 | 579,350 | 190,100 | 44,050 | 52,000 | 116,400 | 101,950 | 601,200 | 2,288,000 | 68,639,150 |
| December . . . | 459,300 | 105,550 | 533,400 | 189,300 | 43,000 | 51,100 | 112,200 | 100,500 | 587,450 | 2,181,800 | 67,636,500 |
| 1931 | | | | | | | | | | | |
| January . . . . | 452,000 | 106,350 | 511,050 | 188,850 | 41,100 | 50,700 | 110,300 | 96,700 | 535,700 | 2,092,750 | 64,874,450 |
| February . . . | 473,750 | 114,450 | 523,700 | 185,600 | 43,950 | 49,950 | 109,800 | 100,100 | 527,300 | 2,128,600 | 59,600,450 |
| March . . . . . | 531,900 | 110,550 | 585,000 | 177,950 | 40,250 | 47,550 | 108,800 | 95,400 | 528,100 | 2,225,500 | 68,990,850 |
| April . . . . . | 543,650 | 109,250 | 723,050 | 185,850 | 39,050 | 47,000 | 111,500 | 95,500 | 527,350 | 3,382,200 | 71,465,750 |
| May . . . . . | 561,950 | 107,400 | 767,200 | 185,950 | 39,200 | 46,650 | 111,250 | 97,500 | 534,150 | 2,451,250 | 75,975,950 |
| June . . . . . | 556,850 | 103,150 | 828,250 | 170,100 | 36,500 | 44,900 | 108,950 | 97,950 | 520,300 | 2,466,950 | 74,009,750 |
| July . . . . . | 527,950 | 100,000 | 912,250 | 157,850 | 33,650 | 41,400 | 107,600 | 94,400 | 517,900 | 2,493,000 | 77,282,700 |
| August . . . . | 306,150 | 101,900 | 976,800 | 153,550 | 30,400 | 37,650 | 109,600 | 92,900 | 510,900 | 2,319,050 | 71,890,200 |
| September . . | 261,050 | 104,600 | 752,250 | 149,950 | 29,600 | 38,000 | 117,400 | 92,250 | 505,550 | 2,050,650 | 61,518,950 |
| October . . . | 423,600 | 103,950 | 865,800 | 153,500 | 29,200 | 37,750 | 121,600 | 93,950 | 503,800 | 2,333,150 | 72,327,750 |
| November . . . | 541,250 | 104,750 | 855,550 | 158,850 | 29,300 | 37,650 | 124,300 | 93,950 | 503,050 | 2,448,650 | 73,460,150 |
| December . . . | 534,650 | 105,500 | 795,500 | 153,550 | 27,850 | 35,100 | 124,500 | 92,150 | 503,000 | 2,371,800 | 72,525,700 |
| 1932 | | | | | | | | | | | |
| January . . . . | 439,250 | 99,400 | 735,450 | 141,050 | 28,850 | 34,250 | 123,050 | 82,800 | 505,900 | 2,190,000 | 67,890,550 |
| Feb. 6 . . . . . | 396,100 | 98,050 | 750,950 | 144,300 | 28,350 | 33,500 | 120,350 | 81,400 | 499,700 | 2,152,700 | 15,068,900 |
| February 13 . . | 404,900 | 98,850 | 725,100 | 140,200 | 28,700 | 33,550 | 120,900 | 82,600 | 503,500 | 2,138,300 | 14,968,100 |
| February 20 . . | 414,150 | 99,300 | 683,700 | 141,300 | 28,500 | 33,500 | 116,050 | 84,250 | 507,300 | 2,108,050 | 14,756,350 |
| February 27 . . | 431,900 | 100,250 | 707,850 | 135,850 | 28,200 | 33,850 | 115,400 | 85,550 | 499,200 | 2,138,050 | 14,966,350 |
| Increase . . . | 17,750 | 950 | 24,150 | ..... | ..... | 350 | ..... | 1,300 | ..... | 30,000 | 210,000 |
| Decrease . . . | ..... | ..... | ..... | 5,450 | 300 | ..... | 650 | ..... | 8,100 | ..... | ..... |

## Last Week's Daily Average Production by Districts

| TEXAS | For Week Ending Feb. 27 | Previous Week |
|---|---|---|
| Panhandle | 47,600 | 49,400 |
| North Texas | 47,300 | 48,350 |
| West Central Texas | 23,650 | 23,700 |
| West Texas | 178,750 | 175,950 |
| East Central Texas | 54,600 | 55,250 |
| East Texas | 304,750 | 279,050 |
| Southwest Texas | 51,200 | 52,000 |
| Texas Gulf Coast | 109,700 | 113,700 |
| TOTAL TEXAS | 817,550 | 797,400 |
| OKLAHOMA | 431,900 | 414,150 |
| CALIFORNIA | 499,200 | 507,300 |
| KANSAS | 100,250 | 99,300 |

*Includes Michigan.

| LOUISIANA | For Week Ending Feb. 27 | Previous Week |
|---|---|---|
| North Louisiana | 28,200 | 28,500 |
| Louisiana Gulf Coast | 26,150 | 27,600 |
| TOTAL LOUISIANA | 54,350 | 56,100 |
| Arkansas | 33,850 | 33,500 |
| MOUNTAIN STATES | | |
| Wyoming | 36,900 | 35,850 |
| Montana | 7,700 | 7,250 |
| Colorado | 3,600 | 3,550 |
| New Mexico | 37,350 | 37,600 |
| TOTAL MOUNTAIN STATES | 85,550 | 84,250 |
| *Eastern States | 115,400 | 116,050 |
| TOTAL UNITED STATES | 2,138,050 | 2,108,050 |

## Summarized Review of Field Results

| State— | Completions This week | Completions Last week | Oil Wells This week | Oil Wells Last week | Gas Wells This week | Gas Wells Last week | Failures This week | Failures Last week | Initial Prod. This week | Initial Prod. Last week |
|---|---|---|---|---|---|---|---|---|---|---|
| Arkansas | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| California | 4 | 1 | 3 | 0 | 0 | 0 | 1 | 0 | 2,550 | 500 |
| Illinois | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Indiana | 0 | 5 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 105 |
| Kansas | 5 | 7 | 3 | 2 | 0 | 0 | 2 | 5 | 2,045 | 150 |
| Kentucky | 2 | 6 | 1 | 2 | 1 | 1 | 0 | 3 | 5 | 195 |
| Louisiana | 5 | 11 | 1 | 5 | 0 | 1 | 4 | 5 | 45 | 1,809 |
| Michigan | 5 | 3 | 1 | 0 | 0 | 0 | 4 | 3 | 20 | 0 |
| Mississippi | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| New Mexico | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 21,939 | 0 |
| New York | 1 | 12 | 1 | 11 | 0 | 0 | 0 | 1 | 3 | 31 |
| Ohio | 18 | 13 | 3 | 4 | 8 | 5 | 7 | 4 | 86 | 115 |
| Oklahoma | 17 | 17 | 6 | 5 | 5 | 7 | 6 | 5 | 29,115 | 12,142 |
| Pennsylvania | 11 | 25 | 0 | 18 | 4 | 5 | 7 | 2 | 0 | 64 |
| Texas | 110 | 149 | 98 | 112 | 2 | 2 | 10 | 35 | 838,648 | 816,410 |
| West Virginia | 5 | 4 | 2 | 0 | 3 | 4 | 0 | 0 | 7 | 0 |
| *Total | 185 | 255 | 121 | 161 | 23 | 28 | 41 | 66 | 894,963 | 831,521 |
| Increase | .. | .. | .. | .. | .. | .. | .. | .. | 63,442 | |
| Decrease | 70 | | 40 | | 5 | | 25 | | .... | |

*Includes one 500-barrel producer completed in Wyoming during the week.

## Comparison of Permits Granted for New Wells

| | For Week Ending Feb. 27 | Previous Week | This Week 1931 | Total This Month | This Month 1931 | Total This Year | Total This Date Last Year | 1931 Year Total |
|---|---|---|---|---|---|---|---|---|
| Arkansas | 0 | 0 | 0 | 0 | 8 | 1 | 12 | 34 |
| California | 5 | 4 | 5 | 18 | 27 | 38 | 53 | 342 |
| Louisiana | 3 | 8 | 4 | 22 | 23 | 63 | 65 | 309 |
| Kansas | 8 | 13 | 14 | 33 | 49 | 78 | 103 | 475 |
| Oklahoma | 17 | 21 | 13 | 62 | 85 | 128 | 204 | 842 |
| Texas | 91 | 109 | 84 | 508 | 233 | 916 | 714 | 6,961 |
| Total | 124 | 155 | 120 | 643 | 425 | 1,224 | 1,151 | 8,963 |

later when the low price of 2¼ cents for gasoline was reached, the crude market reacted to a new low price of but 18 cents a barrel. It is being freely predicted in Mid-Continent marketing circles, however, that gasoline prices are at their lowest point and will undoubtedly show marked recovery in the very near future. In fact, if present crude prices are to be maintained, it will be necessary for refiners to obtain at least from 4⅜ to 4¾ cents a gallon. Continued good weather in a large part of the United States has aided the gasoline situation, since consumption has been above expectancy. This, coupled with concerted efforts to reduce production of gasoline to normal requirements, will probably adjust the market to the tune required by present crude prices. It is apparent, however, that any improvement of this nature will have but little effect upon the crude market. Producers will be fortunate if refiners correct their situation to the point where a continuation of present crude prices is justified, at least until demand for gasoline reaches its seasonal stride.

## Natural Gas Revenue Off Eight Per Cent

Statistics compiled by the American Gas Association for 1931 show that revenues from the sale of natural gas declined eight per cent under 1930. Natural gas sales for the year aggregated 678,433,837,000 cubic feet, a drop of nine per cent under 1930, while industrial natural gas sales amounted to 230,830,346,000 cubic feet, a drop of 12 per cent under 1930. Revenue from the sale of natural gas amounted to $275,794,150. A significant feature of natural gas utilization is is indicated by the fact that while the total production of electric power during 1931 declined by four per cent, the use of natural gas for the generation of power revealed an increase of 15 per cent.

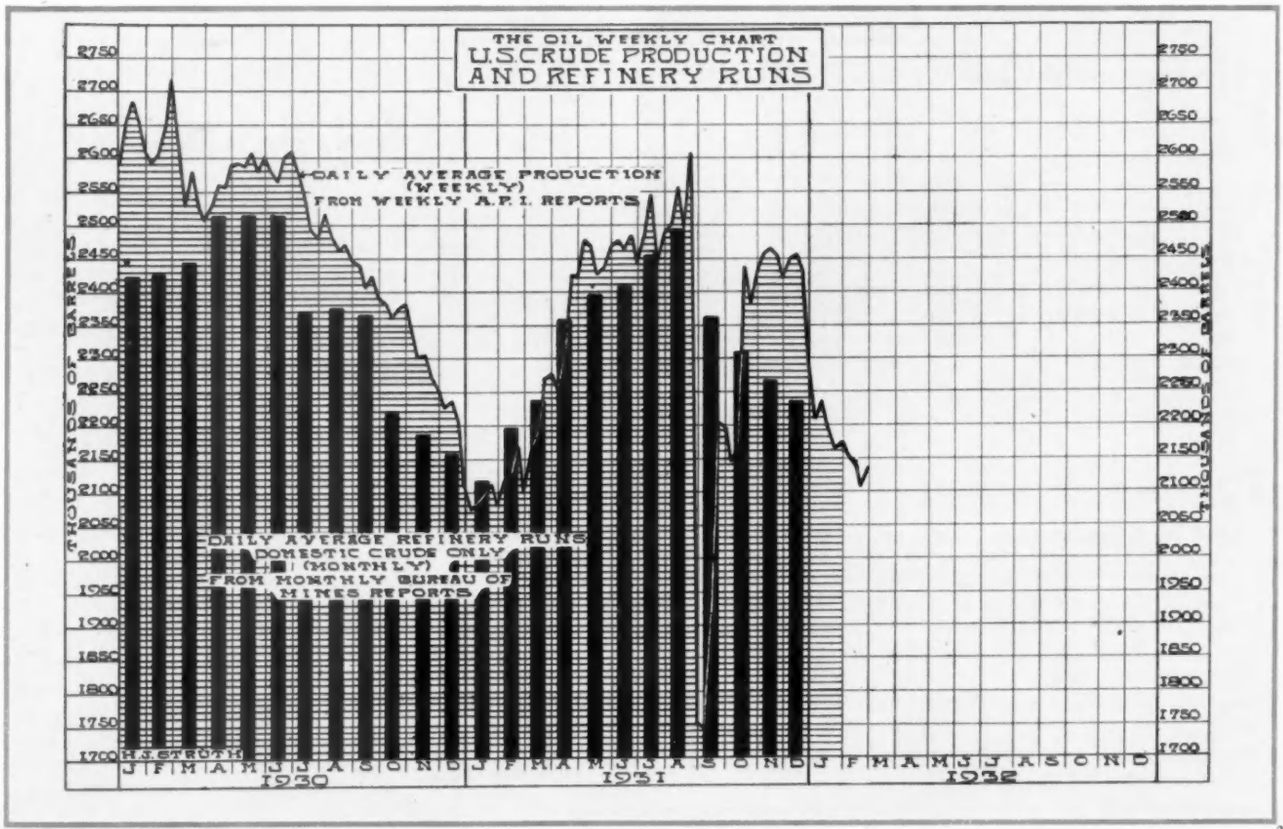
## Standard Group Dividends Lower

Cash dividend payments by companies of the Standard Oil group in the first quarter of 1932 are estimated at $46,717,367, compared with $48,530,230 in the fourth quarter of 1931 and $63,101,997 in the first quarter of 1931, according to records compiled by Carl H. Pforzheimer & Company. Included in the compilation are assumed regular dividends of two companies that had not taken action for the first quarter. The decline in dividend payments for the first quarter of this year reflects in part the passing of dividend by Prairie Pipe Line Company which paid $3,037,000 in the 1931 quarter and a reduction in payments by several other companies. Standard Oil Company of California reduced the quarter dividend rate from 62½ cents to 50 cents a share, while Standard Oil Company (Indiana) reduced the rate from 50 cents to 25 cents in the third quarter of 1931. Extra cash disbursements on capital stock reduction account were made by New York Transit Company and Northern Pipe Line Company.

Payments by quarters for past years have been as follows:

| | First Quarter | Second Quarter | Third Quarter |
|---|---|---|---|
| 1932 | $46,717,367 | ..... | ..... |
| 1931 | 63,101,997 | $57,843,667 | $51,263,688 |
| 1930 | 66,687,168 | 68,555,901 | 68,271,015 |
| 1929 | 63,101,701 | 66,053,389 | 65,426,981 |

| | Fourth Quarter | Full Year |
|---|---|---|
| 1931 | $48,530,230 | $220,739,582 |
| 1930 | 83,012,644 | 286,526,728 |
| 1929 | 75,063,856 | 269,645,927 |
| 1928 | 62,050,357 | 218,740,335 |


THE OIL WEEKLY CHART
U.S. CRUDE PRODUCTION AND REFINERY RUNS
DAILY AVERAGE PRODUCTION (WEEKLY) FROM WEEKLY A.P.I. REPORTS
DAILY AVERAGE REFINERY RUNS DOMESTIC CRUDE ONLY (MONTHLY) FROM MONTHLY BUREAU OF MINES REPORTS
THOUSANDS OF BARRELS
H.J. STRUTH
1930
1931
1932

## Liquefied Gas Sales Increased

An increase of nearly 10,500,000 gallons, representing a gain over 1930 of 58 per cent, brought the 1931 marketed production of liquefied petroleum gases to a total of 28,502,819 gallons, according to report by the United States Bureau of Mines. Since 1922, sales of liquefied petroleum gases have increased from 222,641 gallons to 28,502,819 gallons in 1931. Through the American Gas Association, it was learned that 118 communities in 28 states were supplied with liquefied petroleum gases by 59 companies at the close of 1931. Undiluted gas was distributed in 24 communities by seven companies, the remainder being butane-air plants. One butane-air plant was also reported to be operating in Canada. Compared with previous data, when 59 plants were reported, an even 100 per cent growth is indicated. A division of its uses shows that liquefied petroleum gas was consumed in the following proportions during 1931:

| | Gallons | Per Cent |
|---|---|---|
| Domestic | 15,294,648 | 53.7 |
| Gas Manufacturing | 6,184,655 | 21.7 |
| Industrial and Miscellaneous | 7,023,516 | 24.6 |
| Total | 28,502,819 | 100.0 |

## New Car Sales Off 27 Per Cent

New passenger car sales in the United States for 1931, according to R. L. Polk and Company, were 1,908,141 units, compared with 2,625,979 in 1930. This represents a decline of 27.33 per cent under 1930. Slightly less than 74 per cent of the year's sales were of low priced cars, while sales of commercial cars decreased 23.57 per cent under 1930.

## Standard of Nebraska Surplus Declines

Annual report of the Standard Oil Company of Nebraska, shows a drop in its surplus account of $2,257,723, as of December 31, 1931, from $2,584,156 on December 31, 1930. The statement does not show a profit and loss account for 1931 and, therefore, gives no indication of financial results from its operations. It is seen, though, that the shrinkage in surplus was undoubtedly due to a slump in net profits. Inventory values as of December 31, 1931, amounted to $952,004, against $1,047,374 on the same date of 1930. Cash on hand dropped from $1,507,306 in 1930 to $917,938 in 1931. Investments increased to $1,974,561, from $1,403,056 in 1930.

## Union Oil of California Profits Slump

Annual report of Union Oil Company of California for 1931 shows a net profit of $3,054,912.60, compared with net profits in 1930 of $9,604,996.85. The net profit shown for 1931 was affected by an inventory write-off of $7,210,062.17, which has been charged to surplus. It is seen, therefore, that the company actually sustained a loss during 1931 of $4,155,150.17. The value of sales for 1931 dropped to $27,350,000.49 under 1930; the total sales for 1931 amounted to $61,625,200.50. Earnings per share for 1931 amounted to 70 cents, compared with $2.19 for 1930. Reduction in gasoline business in foreign and Atlantic Coast markets as well as the effect of a serious gasoline price war on the Pacific Coast, influenced earnings of the company last year. General expenses decreased $286,020.15 from 1930, due to reduction in personnel and other economies. State, county and city taxes were also reduced $217,328.02 in 1931, because of the reduction in both quantity and value of oil in storage. Gasoline taxes paid by the company to the states in which operations were conducted last year amounted to $7,756,900.35, while all taxes paid in 1931 exceeded the total dividend payments to stockholders by nearly $700,000.

## Pacific Western Earned Surplus $2,793,392

Pacific Western Oil Corporation's statement for 1931 shows earned surplus of $2,793,392, with total assets on December 31 of $29,084,250. In the balance sheet, under assets, oil inventories amounted to $174,986; materials and supplies $133,326. Cash and securities on hand amounted to $1,064,928 and $8,081 respectively. Properties, plant and equipment, less depreciation and depletion were listed at a total of $26,326,270.

## Cullinan Again Triumphs Over Lee In Control of American Republics

Wilmington. Del.—Control of American Republics Corporation remains in the hands of the Cullinan interests following a contest of proxies at the annual meeting of the corporation here February 25. T. P. Lee of Houston led the faction which, since 1927, has been seeking to oust the management which includes J. S. Cullinan, founder of the group of companies of which American Republics Corporation is the holding concern, and C. F. Cullinan (his son), president. The Cullinan family is reputed to own approximately 30 per cent of the common stock of the company which includes $10,000,000 preferred and 209,180 shares of common, both stocks having voting privilege. Tellers reported the Cullinan faction out voting the Lee contingent by about 25,000 votes. Lee questioned large blocks of the proxies and also selection of J. S. Cullinan as chairman of the stockholders' advisory committee, and the question of court action is under consideration. The board of directors was reelected, including C. F. Cullinan, E. G. Floeter and W. W. Moore of Houston; Frank Cullinan, Dallas, and J. H. Durbin, C. S. Derham and J. R. Miglietto of New York.

Lee has again said that his opposition to the Cullinans is not personal, that he has high regard for them, but that management of the corporation's affairs has been "high-handed and inefficient." He has been associated with J. S. Cullinan since both were with The Texas Company, the former as president, and was an officer in the corporation until 1926 when he resigned and started the fight against the management which has continued to the present contest.

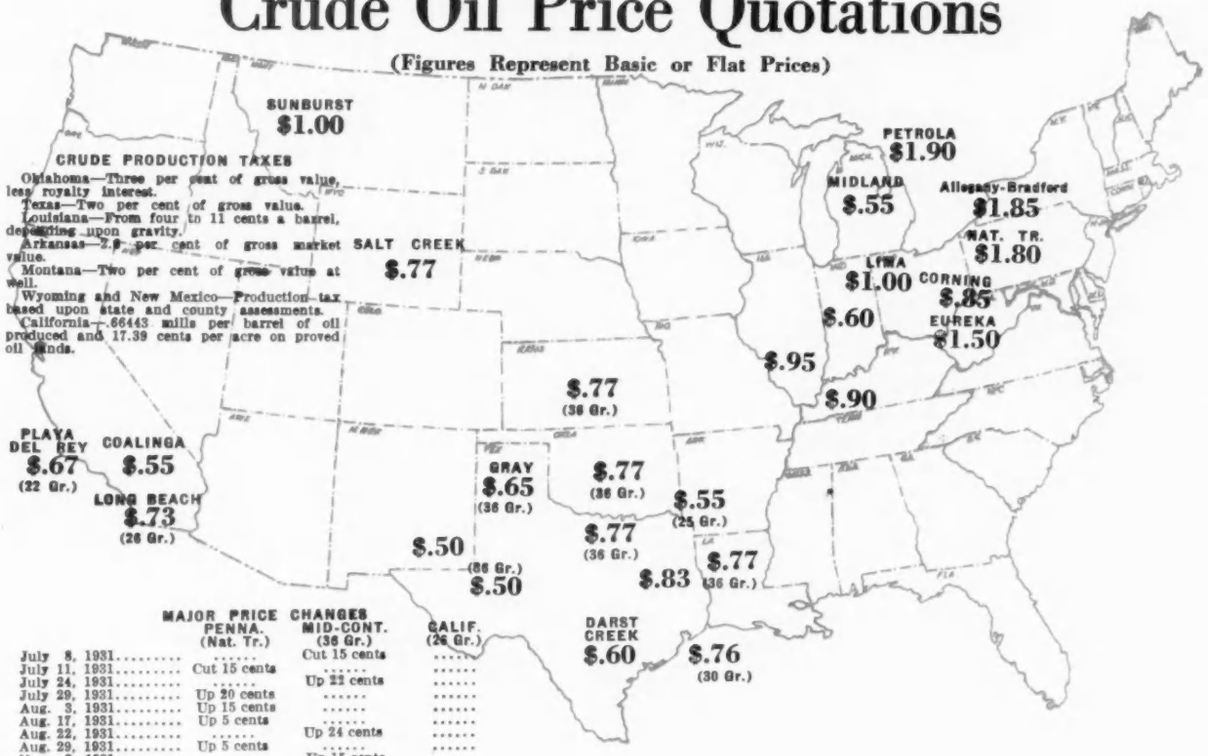
**CRUDE OIL PRICE CHANGES**

***Effective February 25, Joseph Seep Purchasing Agency posted an increase of five cents a barrel on Pennsylvania crude taken by Eureka Pipe Line. The new price is $1.50 a barrel.***

***Effective March 1, Joseph Seep Purchasing Agency posted an advance of five cents a barrel on Buckeye Pipe Line (Ohio) crude. The new price is $1.30 per barrel.***

# Crude Oil Price Quotations

(Figures Represent Basic or Flat Prices)




MAJOR PRICE CHANGES

| | PENNA. (Nat. Tr.) | MID-CONT. (36 Gr.) | CALIF. (26 Gr.) |
|---|---|---|---|
| July 8, 1931 | ..... | Cut 15 cents | ..... |
| July 11, 1931 | Cut 15 cents | ..... | ..... |
| July 24, 1931 | ..... | Up 22 cents | ..... |
| July 29, 1931 | Up 20 cents | ..... | ..... |
| Aug. 3, 1931 | Up 15 cents | ..... | ..... |
| Aug. 17, 1931 | Up 5 cents | ..... | ..... |
| Aug. 22, 1931 | ..... | Up 24 cents | ..... |
| Aug. 29, 1931 | Up 5 cents | ..... | ..... |
| Nov. 2, 1931 | ..... | Up 15 cents | ..... |
| Dec. 16, 1931 | Cut 15 cents | ..... | ..... |

## Official Postings and Differentials

*(Revised to March 1, 1932)*

**California:** (Effective June 19, 1931.)

**Signal Hill, Seal Beach and Alamitos Heights:** 14 to 22.9 gravity 65 cents; 23 gravity 67 cents with differential to two cents for each degree upward. Top price for Signal Hill, 30 gravity, 81 cents; top price Seal Beach and Alamitos Heights, 27 gravity, 75 cents.

**Huntington Beach:** 14 to 21 gravity, 65 cents; 22 gravity, 66 cents with differential of two cents for each degree upward. Top price, 27 gravity, 76 cents.

**Inglewood:** 14 to 19.9 gravity 65 cents; 20 gravity 66 cents with differential of two cents for each degree upward. Top price, 25 gravity 76 cents.

**Playa Del Rey:** 19 to 20.9 gravity 65 cents with differential of one cent for each degree upward. Top price, 25 gravity, 70 cents.

**Olinda and Brea Canyon:** 14 to 19.9 gravity 65 cents; 20 gravity 66 cents; 21 gravity 67 cents; 22 gravity 68 cents with differential of two cents for each degree upward. Top price, 28 gravity, 80 cents.

**Coyote Hills:** 14 to 22.9 gravity 65 cents; 20 gravity 66 cents; 21 gravity 67 cents with differential of two cents for each degree upward. Top price, 28 gravity, 79 cents.

**Santa Fe Springs:** 24 to 26.9 gravity 65 cents; 27 gravity 68 cents; 28 gravity 71 cents; 29 gravity 73 cents; 30 gravity 75 cents; 31 gravity 78 cents; 32 gravity 80 cents; 33 gravity 83 cents; 34 gravity 85 cents; 35 gravity and above 87 cents.

**Whittier, La Habra and Monsebello:** 65 cents a barrel.

**Torrance:** 14 to 21.9 gravity 65 cents with differential of one cent for each degree to 25 gravity and two-cent differential for 25 gravity. Top price, 25 gravity, 70 cents.

**Richfield:** 14 to 20.9 gravity 65 cents; 21 gravity 66 cents with differential of two cents for each degree upward. Top price, 25 gravity, 74 cents.

**Elwood:** 33 gravity 79 cents; 34 gravity 81 cents with differential of three cents for each degree upward. Top price, 36 gravity, 87 cents.

**Newhall, McKittrick and Kern River:** 55 cents a barrel.

**Midway-Sunset, Elk Hills and Buena Vista Hills:** 14 to 21.9 gravity 55 cents; 22 gravity 56 cents; 23 gravity 58 cents; 24 gravity 61 cents; 25 gravity 64 cents; 26 gravity 66 cents; 27 gravity 68 cents; 28 gravity 71 cents; 29 gravity 74 cents; 30 gravity 76 cents.

**Lost Hills:** 14 to 20.9 gravity 55 cents; 21 gravity 57 cents; 22 gravity 59 cents; 23 gravity 60 cents; 24 gravity 62 cents; 25 gravity 64 cents; 26 gravity 66 cents; 27 gravity 67 cents; 28 gravity 69 cents; 29 gravity 71 cents; 30 gravity 72 cents.

**Coalinga:** 14 to 24.9 gravity 55 cents; 25 gravity 57 cents.

**Wheeler Ridge:** 55 cents a barrel.

**Athens, Dominguez and Rosecrans:** 24 to 24.9 gravity 69 cents with differential of two cents for each degree upward. Top price, 34 gravity, 89 cents a barrel.

**Oklahoma, Kansas, North Texas** (Effective January 8, 1932).

Below 29 gravity; 61 cents, with differential of 2 cents for each degree to 40 gravity and above which is posted at 85 cents.

**Texas Panhandle:** (Effective November 2, 1931)

**Gray County:** Below 35 gravity: 61 cents, with differential of 2 cents for each degree to 40 gravity and above which is posted at 73 cents.

**Carson and Hutchinson Counties:** Below 35 gravity; 56 cents with differential of 2 cents for each degree to 40 gravity and above which is posted at 68 cents.

**West Texas:** (Effective November 2, 1931).

**Crane-Upton, Crockett, Ector, Howard-Glasscock, Pecos and Winkler Counties, Texas and Lea County, New Mexico:** 50 cents a barrel.

**Southwest Texas:** (Effective November 2, 1931)

**Refugio: Heavy:** 75 cents.

**Refugio: Light:** (Same as Gulf Coast—see below).

**Gulf Coast:** (Effective November 2, 1931)

**Goose Creek, Hull, Liberty, Orange, Pierce Junction, Mykawa, Moss Bluff, Raccoon Bend, Barbers Hill, Sour Lake, Spindletop, Sugarland, West Columbia, Humble and Refugio Light:** Below 25 gravity: 70 cents, with differential of 1 cent for each degree to 40 and above which is posted at 86 cents.

**Mirando:** 75 cents; **Salt Flat:** 60 cents; **Darst Creek:** 60 cents; **Pettus:** 85 cents; **Markham:** 67 cents.

**East Texas** (Effective November 2, 1931)

Flat Price 83 cents.

**North Louisiana and Arkansas:** (Effective Nov. 4, 1931)

**Caddo, Homer, Haynesville, Bull Bayou, Sabine, Cricton, DeSoto, El Dorado, Cotton Valley, Sarepta, Cartersville:** Below 25 gravity 53 cents with differential of 2 cents for each degree beginning with 25 gravity and ending with 40 and above. Top price 85 cents a barrel.

**Smackover:** 55 cents.

**Rocky Mountain States:** (Effective Nov. 3, 1931)

**Salt Creek:** Below 29 gravity 61 cents; 29-29.9 gravity 63 cents, with differential of 2 cents each degree to 40 and above. Top price 85 cents.

**Elk Basin and Grass Creek:** $1.05; **Big Muddy:** 83 cents; **Lance Lance Creek** $1.05; **Rock Creek:** 85 cents; **Sunburst:** $1.00; **Osage:** 98 cents; **Cat Creek:** $1.05 cents; **Pondera:** 90 cents; **Hogback, New Mexico:** 80 cents.

**Eastern States:** (Effective November 3, 1931)

**Lima:** $1.00; **Indiana:** 60 cents; **Illinois:** 95 cents; **Princeton** 95 cents; **Wooster:** $1.15; **Western Kentucky:** 90 cents.

Pennsylvania: (Effective March 1, 1932)

**Bradford District:** $1.85; **National Transit Oil:** $1.80; **Southwest Pennsylvania Pipe Line Oil:** $1.55; **Eureka Pipe Iine Oil:** $1.50; **Buckeye Pipe Line Oil:** $1.30; **Corning Crude:** 80 cents.

**Michigan:** (Effective Oct. 9, 1931). **Midland:** 55 cents a barrel. **Muskegon:** Same posting as Mid-Continent; 61 cents to 85 cents a barrel.

**Canada:** (Effective Nov. 3, 1931).

**Petrolia:** $1.90; **Oil Springs:** $1.97.

## Can the League of Nations Stop Japan's Oil Supply?

(*Continued from page 10*)

The closing of the Panama Canal to the movement of oil to trans-Pacific destinations would virtually dispose of Trinidad, Venezuela, and Colombia as sources. If not, the blockade of the Caribbean Sea or of the mouths of Maracaibo Lake and the Magdalena River certainly would do the trick. The companies producing oil in Ecuador and Peru, as nationals of member states, would be enjoined from selling oil to a boycotted belligerent; but a naval blockade of the ports of Santa Elena and Talara might be though necessary in such event. Argentina has no surplus of oil for export; and Bolivia is not yet prepared to transport or export oil.

Such projects seem extremely high-handed, from the American point of view, at least; but all are within the concept of the League of Nations.

The planners of any blockade intended to be effective as to oil undoubtedly would seek to accomplish all of these points, and in addition, to blockade the Black and Mediterranean Seas, the Persian Gulf, and the mouth of the Irrawaddy River. The closing of the Bosporus would bottle up Russian and Roumanian oil. Control of the Suez Canal and the Strait of Gibraltar would afford a secondary barrier and would shut off Iraq as a source, although the Arab Kingdom is not yet in position to export oil. Control of the Persian Gulf, which is almost as British in character as is the Suez Canal or the fortifications of Gibraltar, would regulate the oil output of Persia. A mere civil ruling by the Indian government, as a member of the league, would be sufficient to regulate the out-bound movement of oil from fields along the Irrawaddy River, in Burma.

The Dutch East Indian oil-producing colonies, however, probably would be exposed to the danger of attack by an Asiatic naval power thus made desperate in its need for fuel and lubricants for its military and naval machines. There might, in such event, develop a conflict between the traditionally neutral policy of the Dutch shippers and traders and the allegience of the Anglo-Dutch oil companies to British interests through the medium of the great Anglo-Dutch partnership in petroleum.

It also is of some interest to speculate upon the political pressures which might be brought to bear upon these international oil companies in event of war involving the countries in which they operate. The "alien enemy" laws and "trading with the enemy" prohibitions of World War time are remembered in this connection.

**As features of the development of the proposition for the control of oil through League of Nations mandate, it was necessary to assume a given set of conditions, namely: that the league may decide favorably with respect to China's petition; that the United States might support an economic blockade of an Asiatic belligerent held in violation of the league covenant and the peace of the world; and that France would at least remain neutral. (France and the league are, of course, synonymous). This article is largely of a speculative nature; and nothing herein contained should be interpreted as indicating editorial endorsement of such a project.**

## Canadian Crude Output Increased

Official crude oil production statistics of Canada show that output for 11 months ending November 30, 1931, amounted to 1,477,444 barrels, representing an increase over the corresponding period of 1930 of 10.3 per cent. Production in November was reported at 99,037 barrels, against 99,924 barrels in October and 157,063 barrels in November, 1930.

Natural gas production for November amounted to 2,539,948,000 cubic feet, against 1,901,073,000 cubic feet in October and 2,929,939,000 cubic feet in November, 1930.

## Oil Companies in Ouster Suit Present Pleas of Misjoinder

Austin, Texas.—The ninety-eighth district court has recessed till March 7, following hearing of arguments in behalf of Gulf Refining Company's plea of misjoinder in the "Allred" ouster suit against 17 major oil companies doing business in Texas. Attorneys for Sinclair Refining Company immediately had preceded those of Gulf Refining Company with a similar plea.

A few days before presentation of the above pleas of misjoinder, answers in the ouster suit were filed by Standard Oil Company of New Jersey, Standard Oil Company of California, Socony-Vacuum Corporation and Shell Union Oil Corporation following a ruling by Judge J. D. Moore in which the state's service upon the out-of-state corporations was upheld, and the defendants were left before the court on their original answers.

Sinclair Refining Company's plea for a separate trial was premised on the fact that it did not engage in marketing in Texas until about a year after formation and acceptance of the petroleum marketers' code by certain companies in the state.

Shell Union Oil Corporation's answer termed selection of only 17 of the code's advocates as defendents in the ouster suit unjust and unfair discrimination. It emphasized that the code's provisions were adopted to eliminate practices tending toward monopoly.

The answer of Standard Oil Company of New Jersey said that the attorney general's allegations in connection with its ownership of stock in Humble Oil & Refining Company were res adjudicata, having been determined in 1923 in a suit in which the final decision was favorable to Humble Oil & Refining Company.

Socony-Vacuum Corporation's answer denied ever having done business in Texas, as did that of Standard Oil Company of California, while an amended answer filed by Pasotex Refining Company denied conscious or intentional violation of any state law.

When court is resumed, it is understood Attorney General Allred will argue against all pleas of misjoinder that have been submitted, and that he will be followed by John E. Green of Houston, general attorney for Gulf Refining Company.

Also it is understood some of the defense attorneys will direct an attack on the anti-trust laws of Texas when the demurrers are argued.

The hearing of testimony before Commissioner George E. Shelly has not been set, and it appears likely that at least a month will elapse before such hearing begins.

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Washington, D. C.—The Supreme Court of the United States, in a written decision filed before recess of the court on March 1, upheld the Kansas Public Service Commission in its refusal to allow an increase of gas rates in El Dorado, Kansas, by Western Distributing Company, a subsidiary of Cities Service Gas Company, on grounds that the distributor was unable to justify payment of the 40-cent wholesale rate to its parent company.

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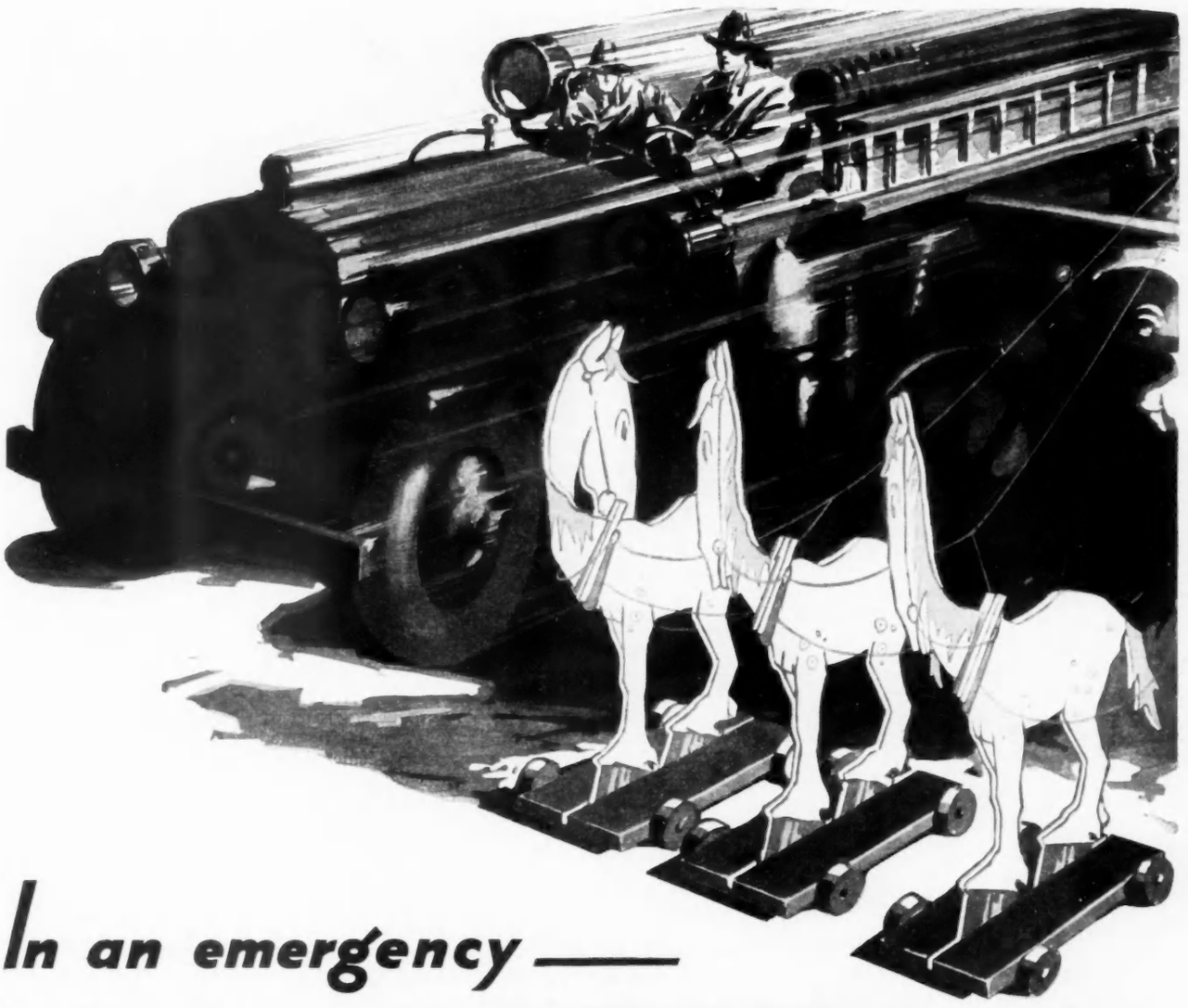
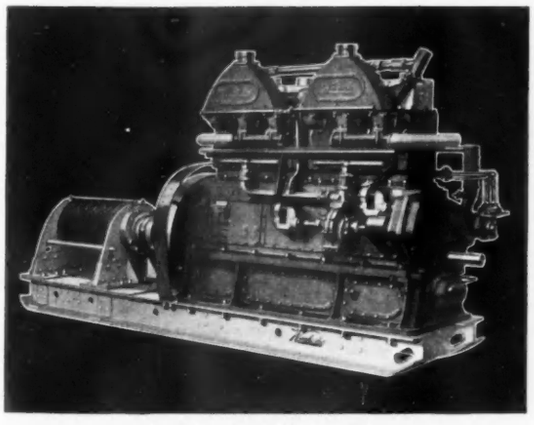
Austin.—Keen interest was manifested by members of the Texas Railroad Commission in the supreme court's decision March 1 which upheld the Kansas Public Service Commission in its refusal to allow an increase of gas rates in El Dorado, Kansas, by Western Distributing Company inasmuch as the Texas commission has under advisement the investigation of gas rates in some of its municipalities.



*In an emergency* ——

# REAL HORSEPOWER OR *PAPER HORSEPOWER?*



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# WAUKESHA ENGINES

# Commission Issues East Texas Rules; Soldiers Remain

(*Continued from page 13*)

chaser" act or the amendment to it passed last summer by the first called session of the Forty-second Legislature.

The provision fixing the per field and per well allowables constituted Rule 27 of the February 25 order, and it calls for a substitute order of similar nature on May 1. The first 26 rules of the order, however, are of permanent nature, and they provide definite instructions with regard to drilling and production practices in the field. Those rules are as follows, being given verbatim as announced by the commission.

### Commission Issues Rules

*Rule 1.* (a) Rule 37, adopted November 26, 1919, is hereby amended insofar as it applies to the East Texas field so as to hereafter read as follows: "No well shall hereafter be drilled for oil or gas at any point less than Six Hundred and Sixty (660) feet from any drilling or completed well: and no well shall hereafter be drilled for oil, or gas at any point less than Three Hundred and Thirty (330) feet from any property or division line; provided, however, the Commission, in order to prevent waste or to protect vested rights, will, after hearing, grant exceptions permitting drilling within a less or shorter distance than hereinabove prescribed, upon application duly filed fully stating the facts, notice of such application and hearing having been first given to all adjacent lessees affected thereby; provided, that if all adjacent lessees affected thereby waive in writing, notice of hearing on or objection to the granting of said application, the Commission may proceed to determine such application without hearing."

(b) Any owner or owners of an oil, gas or mineral lease, covering a tract or tracts of land of the same fee title of Twenty (20) acres or less, shall not drill more than one (1) well for oil or gas on said tract or tracts of land, and such well shall be properly spaced according to Section (a) hereof. Exceptions may be granted as in Section (a) hereof or to meet forced offsets.

(c) Any owner or owners of an oil, gas or mineral lease, covering a tract or tracts of land of the same fee title of Twenty (20) acres or more, shall not drill more than one (1) well for oil or gas on each Twenty (20) acre part or unit thereof and such well shall be properly spaced, according to Section (a) hereof. Exceptions may be granted as in Section (a) hereof, and to meet forced offsets. Each tract shall, however, not contain more than one (1) fractional unit and the division of each such tract into units may be made by the owner thereof, subject to the approval of the Commission. When the equivalent of one (1) well for every unit or fractional unit has been permitted on each such tract of land regardless of the location of the wells on such tract, no additional wells shall be allowed on undrilled units unless and until forced by offsets.

*Rule 2.* A minimum of 100 feet of surface casing shall be run and cemented with at least Thirty (30) sacks of quick-set cement for Ten (10) inch casing and Fifty (50) sacks for Twelve and One-half (12½) inch casing. Cement shall be allowed to set a minimum of Twelve (12) hours before drilling plug.

*Rule 3.* New, or reconditioned, casing that has been tested to 800 pounds per square inch before running, shall set six hours after bailing 2000 feet and before drilling plug. Reconditioned casing that has not been tested before running shall set 12 hours after bailing to 2000 feet and before drilling plug. In both cases, after setting the specified time, if the fluid level shows a raise of 25 feet or more, the well shall be caused to stand a second period of equal time. If, after the second period of equal time, the fluid level shows a rise the casing shall be condemned. After the corrective operations, the casing shall again be tested in the same manner. Operators shall obtain casing clearance permit from the Commission's agent before drilling plug. Casing may be tested by pump pressure providing the mud laden fluid in the hole is replaced by clear water and pump pressure of at least 600 pounds per square inch applied. If at the end of 30 minutes pressure shows a drop of 50 pounds, or more, the casing shall be condemned. Christmas Tree fittings, or well head connections, shall be tested to at least 600 pounds per square inch. Each operator shall show on Form 2 the method of testing and sign an affidavit that the test has been made.

If a Railroad Commission Agent is not available for inspection the operator shall have the test witnessed, preferably by an offset operator. Affidavit of test, on form prescribed by the Commission, signed by the operator and witnessing operator, shall be given to the Commission's agent. If test is satisfactory, a casing clearance permit will be issued by the Railroad Commission's Agent.

*Rule 4.* Any well showing pressure on the bradenhead, or leaking gas or oil between the surface casing and the oil string shall be tested in the following manner: the well shall be killed with water and pump pressure applied through the tubing head. Should the pressure gauge on the bradenhead reflect the applied pressure, the casing shall be condemned and a new oil string shall be run and cemented.

*Rule 5.* All wells shall be equipped with a bradenhead with a working pressure of not less than 600 pounds per square inch. Bradenheads shall not be welded and the same shall be equipped with pipe connections and globe valve accessible at surface. No cement shall be pumped between oil string and surface casing.

*Rule 6.* The producing string of casing in each well must be cemented by pump and plug method, with not less than 150 sacks of cement, and cement shall be allowed to stand a minimum of 72 hours before drilling plug.

*Rule 7.* A blowout preventer in good condition and working order shall be installed on each well before drilling cement plug, coring pay or completing well.

*Rule 8.* All wooden derricks shall be properly guyed and all sills, except framing sills, removed. Well head connections shall be protected by a wooden shed constructed of at least three inch material.

*Rule 9.* All flowing wells must be produced through a separator, or gun barrel of ample capacity and in good working order.

*Rule 10.* All casinghead gas, which cannot be utilized without violating the rules and regulations of the Commission, shall be piped to a point at least 150 feet from any producing well, stock tank, or other fire hazards and burned. All vent lines shall be equipped with back pressure valves. This rule applies to all gas from traps and flow tanks. Gas used from stock tanks, if burned, must be taken care of from a separate riser than the one used for traps and flow tanks.

*Rule 11.* All townsite wells, or wells on school or other small lots, or parcels of land, shall be cleaned through the gun barrel or separator into the stock tanks.

*Rule 12.* All wells shall be cleaned into a pit not less than 40 feet from the derrick floor and 150 feet from any other fire hazard. This rule applies, except in cases covered by Rule 13.

*Rule 13.* The gas-oil ratio of each well shall not exceed 500 cubic feet of gas per barrel of oil.

*Rule 14.* Every operator shall turn in gas measurement of all of his wells along with his regular daily production report, at least twice a month. The gas measurement shall be by wells where possible.

*Rule 15.* All flowing wells shall be equipped with and produced through tubing of not more than two and one-half (2½) inches in diameter. Bottom of tubing shall not be higher than within one joint of top of producing sand. If the tubing is perforated, the perforations shall not extend above the top of the sand.

*Rule 16.* All wells shall be equipped with adequate chokes, or beans, to properly permit the taking of allowable production.

*Rule 17.* All wells producing two percent (2%) salt water must be reported to the Commission office. These wells shall be plugged back until the top of the sand is ten (10) feet above the water table. When this is not possible, the well shall be

allowed a maximum of three feet of producing sand above the top of the plug.

*Rule 18.* All wells encountering the top of the producing sand at minus 3300 feet, or lower, shall be allowed a maximum saturated sand penetration of four (4) feet. Wells encountering the producing sand at a point higher than minus 3300 feet shall be allowed a maximum penetration of two-thirds (2/3) of the distance from the top of the sand to the water table.

*Rule 19.* No air or gas lift artificially applied, in its ordinary form shall be used. Special permission may, at the discretion of the Commission, be granted for the use of special devices for lifting oil using air or gas lift in such forms as will not be injurious to the producing sand. Such devices shall be used in the manner prescribed by the Commission or its duly accredited representatives, and shall be used only after permit in writing has been issued by the Commission or the Chief Supervisor of the Oil and Gas Division.

*Rule 20.* No boiler or electric lighting generator shall be placed or remain, nearer than 150 feet to any producing well or oil tank.

*Rule 21.* All wells shall be completed in the daylight hours before sunset.

*Rule 22.* All permanent oil tanks, or batteries of tanks, must be surrounded by a dyke or fire wall of at least the capacity of the tank or battery of tanks.

*Rule 23.* No well shall be brought into production without a written permit from an authorized agent of the Commission, showing that the well has been properly completed and equipped If inspection is not made within twenty-four (24) hours after written notice is given said agent, written permit shall be waived.

*Rule 24.* All purchasers, pipelines and/or carriers of crude petroleum, shall equip their gathering lines from field storage tanks with lock-stops. New ball seals with name or initial of gathering or purchasing company, numbered consecutively, shall be attached to each stop-cock after each run of oil.

*Rule 25.* Any rubbish, or debris, that might constitute a fire hazard, shall be removed to a distance of at least 100 feet from the vicinity of wells, tanks and pump stations. All waste oil shall be burned or disposed of in such manner as to avoid creating a fire hazard or polluting streams and fresh water strata.

*Rule 26.* "All wells having a total depth within ten (10) feet of the current water table as determined by the Commission, shall be required to produce at a rate not exceeding twenty (20) barrels per hour."

All conservation rules of the Commission heretofore promulgated, to govern statewide oil and gas operations which have not expired by their terms and which are applicable in the East Texas field, shall still be enforceable unless in conflict herewith.

# This Research Should Not Stop

ANY effort on the part of the United States congress to reduce the government expense is laudable, but each cut proposed is worthy of the most careful scrutiny as to the effects of the economy. Many governmental activities which appear to the average citizen as non-essential are really of great import when their purposes are understood.

A case at point is an amendment offered by Representative Douglas of Arizona which would reduce the appropriation for the Bureau of Mines in such measure as to curtail practically to nullification the researches of the Petroleum and Natural Gas Division of the bureau.

The petroleum division of the bureau has been fostered to its present scope and efficiency of organization no doubt upon the hypothesis that the government itself has a major interest in petroleum through ownership of both oil bearing and shale lands to the extent that the researches undertaken by the bureau in this connection are justified for the government's own interest. Added to this is the benefit that the petroleum division is to the major industry with which it works. And the words with which it works are used advisedly, for probably no other line of research undertaken by a governmental body is more actively aided, coordinated and applied than is the work of this division. The petroleum industry, working both through its units and its societies, is taking full advantage of the research of the bureau in this direction, and the expenditures of private capital make the appropriation of the government only a supplement. And this does not mean depreciation of the bureau's activities, either in scope or importance.

The forces and the phenomena with which the oil industry works are so complex that the line of demarcation between pure science and industrial practice is hard to determine. For this reason researches which to the mind not trained to the ways of petroleum are of no interest or importance often are of vital concern. This condition existing, upon the men in the industry falls the duty of calling to the attention of their congressmen the importance of continuing the activities of the bureau in its petroleum experiments and investigations.

The proposed reduction in the appropriation would be approximately 37 per cent. What work would discontinue would be determined, of course, by the heads of the department. But it is certain that it would mean dropping many of the personnel and closing field offices. It would also mean stopping important researches now underway in refining, new equipment for which has recently been installed at Bartlesville; important work on the testing of gas wells and study of the flow of gas through pipe lines would have to be deferred. Another important research that is just getting started in East Texas and at Oklahoma City—bottom hole pressures and the amount of gas dissolved in oil—would be either curtailed or deferred.

The situation certainly justifies the industry, especially those interested in its technical advancement, in informing their representatives in congress of the importance of keeping the earnest researches of the department on the job.

## Production Practice Topical Committee Headed by Hardison

Dallas, Texas.—Harvey Hardison, of The California Company, Midland, Texas, has been appointed national chairman for 1932 of the Topical Committee on Production Practice, which is an adjunct of the Central Committee on Drilling and Production Practice of the American Petroleum Institute. Personnel of the Topical Committee follows:

HARVEY HARDISON

**California District**

E. W. Masters, Shell Oil Company, Los Angeles, (chairman); H. A. Brett, Union Oil Company of California, Santa Fe Springs, (secretary); L. L. Brundred, Spang, Chalfant & Company, Los Angeles; A. S. Hayes, General Petroleum Corporation of California, Los Angeles; H. N. Marsh, General Petroleum Corporation of California, Los Angeles; E. W. Spurlock, Standard Oil Company (Koonz Lease), Santa Fe Springs; J. H. Wallace, Jr., Union Oil Company of California, Santa Fe Springs; and D. K. Weaver, The Texas Company, Long Beach.

**Eastern District**

Paul D. Torrey, consulting geologist, Bradford; John C. Askam, The Ohio Oil Company, Findlay; Joseph A. Holmes, Jr., Pan American Petroleum and Transport Company, New York; and C. E. Reed, Hope Natural Gas Company, Clarksburg.

**Mid-Continent District**

L. A. Ogden, The Empire Companies, Bartlesville, (chairman); Watson Bettis, Gypsy Oil Company, Drumright; C. M. Copeland, Comar Oil Company, Marland; K. A. Covell, Indian Territory Illuminating Oil Company, Oklahoma City; H. C. Fitzpatrick, Prairie Oil & Gas Company, Independence; E. H. Griswold, Continental Oil Company, Ponca City; F. B. Hall, Tidal Oil Company, Tulsa; L. B. Holland, Phillips Petroleum Company, Oklahoma City; H. E. Shaffer, The Pure Oil Company, Seminole; and D. L. Trax, Gypsy Oil Company, Tulsa.

**Rocky Mountain District**

J. J. Zorichak, Midwest Refining Company, Denver, (chairman); T. H. Andrews, Midwest Refining Company, Midwest; L. C. Binning, Prairie Oil & Gas Company, Bairoil (Lost Soldier Field); and Joe Dyer, Continental Oil Company, Columbine.

**Southwestern District**

H. M. Staggs, Atlantic Oil Producing Company, Dallas, (chairman); A. L. Faber, Arkansas Light & Power Company, Pine Bluff; Geo. B. Corless, Humble Oil & Refining Company, Houston; R. B. Kelly, The Pure Oil Company, Fort Worth; L. L. Lookabaugh, Shell Petroleum Corporation, Dallas; W. L. Olmstead, Panhandle Refining Company, Wichita Falls; T. W. Rhoads, Gulf Production Company, Fort Worth; John A. Ritter, Sun Oil Company, Dallas; W. C. Shutts, Humble Oil & Refining Company, Houston; F. M. Stauffer, Wichita Falls; and W. V. Vietti, The Texas Company, Wink.

## Name Topical Committee For Development Research

Dallas, Texas.—Donald E. Dickey, Broderick & Bascom Rope Company, Los Angeles, has been named national chairman of the Topical Committee on Development and Production Research of the American Petroleum Institute's Central Committee on Drilling and Production Practice which has been appointed for 1932. Other members of the committee, appointed by Charles F. Roeser, chairman of the Division of Production, are:

**California District**

G. V. D. Marx, Standard Oil Company of California, San Francisco, (chairman); C. J. Coberly, Kobe, Inc.; F. E. Davie, Shell Oil Company; John F. Dodge, University of Southern California; Stanley C. Herold, Union Oil Company of California, Los Angeles; Wm. N. Lacey, California Institute of Technology, Pasadena; F. G. Tickell, Stanford University, Palo Alto; and Lester C. Uren, University of California, Berkeley.

**Eastern District**

K. B. Nowels, Forest Oil Corporation, Bradford, Pennsylvania (chairman); Charles R. Fettke, Carnegie Institute of Technology, Pittsburgh; Paul V. Foote, Gulf Oil Companies, Pittsburgh; N. C. Fowler, U. S. Bureau of Mines, Washington; Joseph A. Holmes, Jr., Pan American Petroleum and Transport Company, New York; H. J. Lowe, The Pure Oil Company, Chicago; and H. B. Soyster, U. S. Geological Survey, Washington.

**Mid-Continent District**

C. V. Millikan, Amerada Petroleum Corporation, Tulsa, (chairman); L. G. E. Bignell, Oil & Gas Journal, Tulsa; Joseph Chalmers, U. S. Bureau of Mines, Bartlesville; K. A. Covell, Indian Territory Illuminating Oil Company, Oklahoma City; A. F. Melcher, Tulsa; and H. H. Power, Gypsy Oil Company, Tulsa.

**Rocky Mountain District**

F. E. E. Germann, University of Colorado, Boulder, (chairman); B. B. Boatright, Colorado School of Mines, Golden; and J. J. Zorichak, Midwest Refining Company, Denver.

**Southwestern District**

H. D. Wilde, Jr., Humble Oil & Refining Company, Houston, (chairman); M. G. Cheney, Anzac Oil Company, Coleman; R. H. Fash, Fort Worth Laboratories, Fort Worth; Stanley Gill, Houston.

## Southwest A. P. I. Engineers Meet at Tyler on April 14-15

Dallas, Texas.—Drilling and production problems in the East Texas field will be the chief subjects of discussion at the regular spring meeting of the southwestern district American Petroleum Institute division of production, which will be held in Tyler, Texas, on April 14 and 15, 1932.

Announcement as to papers and speakers for the Tyler meeting is not yet available, but a committee has been selected to prepare the program, its members including the following men: E. S. Durward, Shell Petroleum Corporation, Dallas, chairman; W. W. Scott, Humble Oil & Refining Company, Houston; H. M. Staggs, Atlantic Oil Producing Company, Dallas; M. Albertson, Shell Petroleum Corporation, Dallas; Blaine Johnston, Simms Oil Company, Dallas; John A. Ritter, Sun Oil Company, Dallas; and R. B. Kelly, Pure Oil Company, Fort Worth.

The regular annual election of district officers will be held at the Tyler meeting, and the following nominating committee has been appointed: Walter H. Meier, Atlantic Oil Producing Company, Dallas, chairman; C. W. Alcorn, Shell Petroleum Corporation, Dallas; and Sam Gladney, Sun Oil Company, Dallas.

## Speculate on Probable Successor For Pat Neff Should He Resign

Austin, Texas.—In the event State Railroad Commissioner Pat M. Neff resigns to accept the offered presidency of Baylor University, Governor Sterling will immediately appoint a successor, thus eliminating several who have been suggested for the commission post because of their holding elective offices with the state.

J. W. E. H. Beck, senator from De Kalb, and Mayor Earnest O. Thompson of Amarillo have been mentioned as likely prospects for the appointment, though the governor will not discuss the matter until Neff's resignation as railroad commissioner. Representative Ed. T. Murphy of Livingston, who became interested in the commission through sponsorship of two bills for regulation of trucks and busses, is mentioned also as a likely prospect.

It is said that if Beck and Murphy, known to be in harmony with the governor's ideas, were placed on the commission the governor would probably deem their administration of the conservation law in regulating East Texas oil production adequate without the need of martial law.

# Personal Mention—Men You Know

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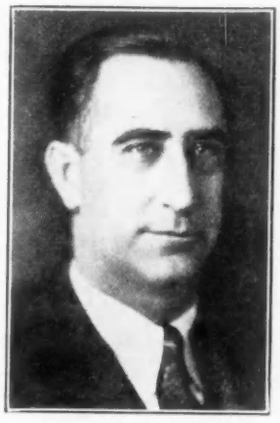
ANGUS McLEOD, manager geological operations for Shell Petroleum Corporation in the Southern district, comprising Texas, New Mexico, Louisiana and Arkansas, with headquarters at Dallas, Texas, was elected chairman of the Dallas Petroleum Geologists on February 16. McLeod succeeds R. B. Whitehead, chief geologist for Atlantic Oil Producing Company, as head of the Dallas body, which is associated with the American Association of Petroleum Geologists.



ANGUS McLEOD

L. W. Orynski, district geologist for The California Company, was elected vice-chairman. Sam M. Aronson, geologist for Atlantic Oil Producing Company, was retained as secretary.

McLeod is a native of Ripley, Ontario, Canada. He received his A. B. degree at the University of Toronto, then completed his education at the University of Chicago. His first contact with the oil industry was made while in the services of Harrison & Eaton, Denver, consulting geologists. This engagement was followed by his joining of the geological staff of the Midwest Refining Company. While with the latter company a more attractive opportunity was presented by Shell Petroleum Corporation for duty in the Southwest. He has been with Shell Petroleum Corporation for 12 years.

Membership is held by McLeod in the American Association of Petroleum Geologists, American Association for the Advancement of Science, American Institute of Mining and Metallurgical Engineers, and the American Petroleum Institute.

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WILLIAM R. BOYD, JR., New York, executive vice-president of the American Petroleum Institute, has yielded to the importunings of his staff and retired from business activity to take a short rest. The board of directors meeting of the institute held February 18 was the first one Mr. Boyd has missed in 11 years. He is expected to be back at his work within a few days.

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C. V. LORD has been elected vice-president and general manager of Bolsa Chica Oil Corporation of California. He was formerly vice president of Buck and Stoddard at Los Angeles.

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LLOYD F. BAYER, vice-president of Associated Oil Company, recently addressed the Executives Association of San Francisco on "The Oil Industry." Bayer stressed the importance of the Sharkey bill as a measure which will help to control oil production without economic waste.

FRED MARSH, who has been connected with General Petroleum Corporation of California since 1910, has been retired from active service. He has been in the oil industry for more than 40 years. He will be succeeded by David Carruthers of Ventura Avenue.

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FRED S. VAILE, president of the Petroleum Accountants Society of Los Angeles, presided at the monthly meeting held February 25. Dwight A. Moore, Wilshire Oil Company, was special chairman of the evening.

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WALTON E. GILBERT, consulting petroleum engineer of Pasadena, California, is preparing to give a large portion of his time to surveying of wells. While employed by Shell Oil Company he helped to perfect a surveying device which was used successfully in many fields.

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H. J. DUNCAN, Muskogee, Oklahoma, has been appointed supervisor of the mineral leasing division of the U. S. Geological Survey, Casper, Wyoming, to succeed Hale B. Soyster who was recently promoted and sent to Washington. Mr. Duncan has been a deputy supervisor at Muskogee.

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J. W. STEELE, formerly supervisor of the mineral leasing division, U. S. Geological Survey, who has until recently been in charge of the Sinclair interest explorations in Portuguese, West Africa, has re-entered the service and been appointed deputy supervisor of the mineral leasing division of the survey at Roswell, New Mexico.

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RALPH E. FAIR

RALPH E. FAIR, representative of The Oil Well Supply Company in Roumania, owner of the firm of Exploatarea Petrolifera Ralph E. Fair, S. A. R., drilling contractors, of Ploesti, Roumania, and part owner of the Lucey Petroleum Corporation, which operates in the East Texas fields, sailed from New York last week en route his European headquarters after an extended sojourn in the United States.

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CHARLES ALLEN, of the engineering staff of Caribbean Petroleum Company at Cabimas, Venezuela, arrived in New York last week aboard the s/s "Carabobo," of the Red D Line, whence he will go to California on three months leave. William Shaw and Stanley J. Riley, of the oil accounts department of the same company, were passengers aboard the same ship, en route to England.

# News From California Fields

**BRAD MILLS, *Staff Representative, Los Angeles, California***

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## Bad Condition of Hole Postpones Decision of North Dome Producer

Coalinga, Calif.—The production test in North American Oil Consolidated's Elsinore 1, edge well on the North Dome, has not been convincing either way, and it is impossible to predict the outcome of a test which the majority of operators believe will make a producer under favorable conditions. Drilled to 8713 feet and tested with a string of 6⅝-inch casing cemented at 8356 feet, Elsinore 1 has been flowing under adverse circumstances. The well flowed at the rate of 100 barrels per hour on short tests, but the fresh water cut has increased from about three per cent to almost 35 per cent. A gross rating of 2400 barrels per day has been given the well, but the high percentage of water and the fact that only short flows have been made make the producer a doubtful performer.

With a gas flow around 1,000,000 cubic feet, the quantity of fluid appears remarkably high. This low gas production can not be explained at this stage of the test, but the encroachment of water, or a flow of water from the top of the Temblor may be responsible. The fact that the water is chiefly fresh points to the Temblor as its source, but this has not been definitely established. The brown shale above the Temblor has normally produced salt water. The 9⅝-inch shutoff over the Temblor was made at 7778 feet. The string of 6⅝-inch casing froze at 8356 feet and was cemented at this point. There is the possibility that this casing fell just short of shutting off the questionable formation. The gravity of the oil averaged 34.8 degrees.

Elsinore 1 is a very important test, in that it should help to define the producing limits of the field. The well is located inside the "blue" line, but just outside the "red" line, the boundaries set up by the majority of the Kettleman North Dome Association to define the acknowledged and probable producing limits of the North Dome. The red line is the boundary which is recognized by the most conservative and all acreage within this line was considered productive when the association was formed. The blue line extends on an average of one-half mile farther out from the center of the field than the red line, so far as the northeast side of the field is concerned, while the difference between the lines along the southwest side is much less. These lines were necessary, due to claims of various permit holders, and it was reasonable to suppose that each operator claimed as much as possible. The zone between the red and blue lines will be recognized as productive or unproductive, as development proves its status.

Elsinore 1 probably will be killed and deepened in an effort to shut off the water and include more of the Temblor. The completion depth is much shallower than the maximum will allow for the formation. The well is an offset to Shell Oil Company's Dixon 1, which barely falls inside the red line and which was a 7000-barrel producer at 8807 feet. Storage capacity was too limited to permit a steady test of Elsinore 1.

Petroleum Securities Company has added trouble in Burbank 1, Middle Dome test, with the drill pipe frozen at 5250 feet. The latest fishing job developed while attempting to pull the remaining portion of the small flow string. This well was drilled to 9332 feet and plugged back to 9208 feet for a production test. Production was 1200 barrels of oil and about 1000 barrels of water.

North American Oil Consolidated has made little progress in Blauvelt 1, edge test on the North Dome, which has been held up with a bad fishing job. The drill pipe froze around 8800 feet, and while fishing for the lost section, a portion of the washover pipe was also lost. This well was drilled to 9500 feet and is the deepest well yet drilled at Kettleman Hills.

## Baldwin Hills-Inglewood Success Would Start Important Campaign

Los Angeles.—The present drilling in the Baldwin Hills-Inglewood field is considered important, but it is not as much the possibility of large completions from the few drilling wells as the fact that any kind of commercial producer may start increased drilling, that appears most significant.

E. K. Allison Syndicate swabbed Moynier 1 on a production test at 6105 feet and obtained some gas and oil, but the well sanded up before results were conclusive. A production of 200 barrels on the pump is possible. Production of any size at this depth and location is important.

Baldwin Hills Syndicate is awaiting the running of a string of casing in Sentous 1, which was drilled to 4094 feet and which promises to develop commercial production at a new level. A recent production test showed oil and gas, but the outcome is still in doubt. Good oil sand was cored below 4000 feet, but the condition of the hole might have affected action of the well.

Fear of deep development in the main part of the field was held for a long time, but no effort has been made to drill the deeper zones since they were proved productive. The field is one of the shallowest in the Los Angeles basin and is admittedly a great reservoir.

## Kern County Wildcatting Reacts Quickly to Signs of Improvement

Bakersfield, Calif. — Wildcatting in Kern County has suffered heavily from conditions, but this district in the past has always shown a tendency to come back rapidly at the first signs of improvement. The demand for heavy oil has declined, but the increase in cracking may eventually call for a greater supply of low gravity oil. Drilling near some of the older fields with the view of extending the producing limits is being considered. Barnsdall Oil Company is drilling a short distance north of the Wheeler Ridge field on the theory that a slightly tilted anticline will prove productive. The well is approaching a depth of 4000 feet. Descanso Oil Company is drilling on another side of the Wheeler Ridge field, on Section 31-11-19, but did not expect showings above the present depth of 1500 feet. Efforts are being made to develop production in the Devil's Den district, but possibility of a large output in this area seems remote.

## Gas Prospecting in Dudley Ridge District Encouraged by Showings

Bakersfield, Calif.—The search for gas production in the Dudley Ridge district and around the edge of the Tulare lake basin has been encouraged by the success of a few wells which have developed a good flow of dry gas at shallow depths. This general district lies about seven miles east of Kettleman Hills and failed to warrant much enthusiasm until two or three wells developed commercial gas production. The dry gas was not regarded with favor for a time, but the thought of a decline in the output at Kettleman Hills and the acceptance of Dudley Ridge gas by some of the purchasing companies were enough to attract small operators to the district. Eagle Oil & Gas Company has rebuilt the rig for No. 1, which recently blew out and flowed at a good rate before sanding up. The flow was estimated at 20,000,000 cubic feet of dry gas.

## Deep Producing Zone at Elwood Being Conserved for Better Market

Santa Barbara, Calif.—Withholding development of the Sespe formation at Elwood is affecting field work now, but conservation of this deep producing zone places the field in an excellent position to stage a comeback when conditions warrant a higher production. Barnsdall Oil Comany and Rio Grande Oil Company completed the discovery well several months ago with an initial production of 3000 barrels from a depth of only 4396 feet, and for a time another drilling campaign was threatened. The well was shut in and all locations suspended. The field does not have an active drilling well, in sharp contrast to the large number of a short time ago. Producing practices have been questionable and the potential has dropped sharply from a high level of more than 100,000 barrels daily.

## Failure to Produce and Prevent Drainage Causes Lease Forfeiture

Los Angeles.—The average California producing company is vitally interested in a decision handed down recently in the Superior Court at Los Angeles, Judge Dailey S. Stafford having ruled that Union Drilling & Producing Company is no longer entitled to hold certain leases in the Athens field, because of failure to produce wells continuously and to prevent drainage of the leases. The company was named defendant by interests holding small leases in the Athens field and the court also held that the defendant must pay damages to the plaintiffs in the sum of $4513, because of failure to protect the lots from drainage. Through failure to comply with certain provisions of the lease, the defendant will forfeit the right to longer retain the property, besides having to pay damages incurred by offsetting companies, the court held.

## Little Likelihood of New Field From Los Angeles Basin Wildcats

Los Angeles.—The Los Angeles basin now supports a very slim crop of interesting wildcats, and there appears little immediate likelihood of a brand new field from the small number now active. Several extension tests have a chance to produce, but these are for the most part in districts which were regarded as semi-productive for some time.

Ajax Petroleum Company is coring hard gray sand at 7145 feet in Mesa 1, a deep test in the Newport Beach district, but the absence of substantial streaks of oil sand has been discouraging. Oil and gas showings have been encountered at various levels. The formation checks closely with that found in deep tests at Huntington Beach.

William L. Jones reports oil and gas showings around 1050 feet in Graham 1, a wildcat test near Lynwood, but too much should not be expected at such a shallow depth. A string of casing will be run to some point near bottom. It has not been unusual to find good oil showings at shallow depths in wildcats in the Los Angeles basin. Sometimes this has meant the existence of good oil sands below, but often this has not been the case.

## Commercial Production Obtained Beyond Former Limits of Torrance

Los Angeles.—Ranger Petroleum Company has further increased production in Watson 2, an extension test east of the Torrance field, and by lowering the tubing has brought production on the pump up to 100 barrels. The importance of this well does not lie in the size of the output, but in the fact that commercial production has been obtained so far from the former limits of the field. Claims have been advanced that an entirely new field has been found, but most geologists think the well an extension of the Torrance field.

## Standard to Continue Orderly Development in Seal Beach Field

Los Angeles.—Decision of Standard Oil Company of California to deepen one well at Seal Beach and start another one from the surface does not mean that the company will do extensive offsetting in the field. Rig has been completed for San Gabriel 25, and San Gabriel 12 will be deepened from 5451 feet.

Continental Oil Company is drilling in oil sand at 6300 feet in McGrath-Selover 26 and will complete the well in the McGrath zone. This company has been a pioneer in deep drilling at Seal Beach and recently fell short of commercial production in a test which was drilled to 9056 feet.

The conservatively developed portion of the Seal Beach field has shown a slow decline for several years and still is regarded as a substantial reservoir. Standard Oil Company of California, Associated Oil Company and Continental Oil Company control the acreage in this part of the field. The Alamitos Heights section was intensely developed and proved unprofitable for many small operators.

## Widespread Gas Prospecting Expected in Yolo County, Report

San Francisco.—The acquisition of a large acreage in Yolo County two weeks ago by Pacific Northern Oil & Gas Company bears out current reports that drilling for natural gas over a wide area will show a steady increase. The block taken over by this San Francisco capital included the acreage held in Yolo County by the George F. Getty, Inc., interests, on which a well was drilled to 2007 feet more than a year ago. The new company will attempt to complete this well and may drill more tests on the property. Standard Oil Company of California holds a large acreage adjoining much of the land acquired by Pacific Northern Oil & Gas Company. The primary object will be to develop natural gas, but there is some possibility of oil production. The demand for natural gas has grown in the central part of the state until the search for new fields is not unexpected.

# Oklahoma--Kansas Field Notes

**FLOYD SWINDELL,** ***Staff Representative, Tulsa, Oklahoma***

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## Oklahoma City Output Up; Two New Producers Added in Field

Oklahoma City.—Daily average production from Oklahoma City for the past week went up to 109,320 barrels, the highest figure that it has reached since the week ending January 9, when it produced at the rate of 144,630 barrels. A review of the drilling wells shows that of the total of 26 active tests at the end of the week, 11 were drilling above 5000 feet, seven were between 5000 and 6000 feet, and eight were below 6000 feet. Of the latter group, three were below 6400 feet. At the same time there were five locations and 15 rigs, cellars and foundations. Completions for the past few weeks have been at the rate of about two a week but this rate apparently should increase during the next two weeks when most of the eight tests now below 6000 feet should be completed.

Two wells were completed and a third was ready to complete as soon as connections could be made. Ocate Oil Company's Smith 3, SE NE SE NW Section 15-11n-3w, flowed 747 barrels the first 30 minutes and making gas at an estimated rate of 20,000,000 cubic feet. Production is coming from Wilcox sand topped at about 6372 feet and drilled to 6510 feet. This is the second producer on the lease. Smith 2 is drilling below 6070 feet after losing the first hole at 5460 feet. Ocate Oil Company is made up of officials of the Mid-Continent Petroleum Corporation. Refiners Production Company's Buchanan 1, SE SW NE Section 10-11n-3w, flowed 512 barrels the first 30 minutes and during the two hours that it was open gas increased from 65,000,000 to 90,000,000 cubic feet. Six-inch casing was set at 6318 feet and the well drilled to 6440 feet in Wilcox sand.

Harrell and Davis' Fish 1, NE SE SE Section 22-11n-3w, in the southwest portion of the pool, became ignited while cleaning out into the slush pits but was shut in on the master gates with practically no damage. Total depth is 6505 feet, 75 feet below the casing point for the last string. This test is a north offset to Continental Oil Company and Kessler Oil and Gas Company's Canning 1, which had a potential of more than 20,000 barrels, and is a west offset to Phillips Petroleum Company and Shell Petroleum Corporation's Egermier 2, which furnished one of the big disappointments in that part of the field when it came in a relatively small well. Fish 1 has shown indications of being a big well but with the condition of offset initial production no accurate prediction can be made prior to the potential gauge which probably will be taken within a few days.

Among the tests which should next appear on the completion list are Anderson-Kerr et al's Volk 1, NW NW SE Section 15-11n-3w, which was waiting on cement to set on the nine-inch at 6408 feet, total depth 6429 feet; R. A. McArthur et al's Pruitt 1, NE NW SE Section 22-11n-3w, waiting on cement on the nine-inch at 6440 feet with total depth at 6452 feet; Wellesley Oil & Gas Company's Cowell 1, SW SW NE Section 22-11n-3w, drilling below 6507 feet; Grison Oil Company's Turner 1, NW SW SE Section 34-12n-3w, waiting on cement to set on nine-inch at 6330 feet with total depth at 6350 feet; and Slick-Urschel, Incorporated's Terminal 3, SW SE NW Section 3-11n-3w, drilling below 6460 feet with six-inch casing set at 6319 feet.

## Leasing Holds Kansas Interest in Barton-Ellsworth Arch Area

Wichita, Kansas.—Although second in number of active locations in Kansas, the Barton-Ellsworth Arch area is holding the interest of Mid-Continent oil men because of the stimulation which recent wildcat discovery wells have given lease trading. Major companies, many of whom hold large blocks in the area, have been buying in small tracts scattered throughout the five principal counties. Recent buying has been most noticeable in Barton County, which now is covered almost solidly. During the past week five tests, one of which is a wildcat, were in the pay and due to be tested within a few days. Gypsy Oil Company's Steckel 1, CNE NW Section 31-19s-10w, 2½ miles northeast of the Hilligos et al's Isern 1, was shut down for tankage with 2900 feet of oil standing in the hole. Drillers logged top of the Arbuckle limestone at 3299 feet and had first pay at 3316 feet. Total depth is 3324 feet.

Aylward et al's Stratman 2, NE NW SE Section 1-17s-10w, north offset to the discovery well in the Stratman pool, swabbed 120 barrels of oil per hour and had shown no water. Production is coming from Arbuckle limestone at 3267 to 3286 feet. Stratman 1, the discovery well, is rated at about 2400 barrels on the beam. Midwest Exploration Company's Allen 29, CSW SW Section 31-22s-11w, northeast offset to Richardson 36, swabbed 44 barrels per hour the first three hours and was unable to lower the fluid below 2300 feet. Top of the pay was reported at 3529 feet and at 3550 feet, oil was standing within about 140 feet of the surface. Total depth is 3560 feet. It probably will be drilled deeper since the first well was not completed until a depth of 3599 feet was reached. Derby Oil Company's Stratman 1, NE NW NE Section 12-17s-10w, was waiting on connections with the hole standing full of oil. Six-inch casing was set on top of the lime at 3253 feet and the formation cored from that depth to 3257 feet. At 3283 feet it was swabbed at the rate of 14 barrels per hour. After a short test the hole was shot with 50 quarts from 3255 to 3270 feet.

Williams and Moore's Stratmore 1, CSW SE Section 23-16s-10w, which has been in the pay for more than two weeks, was still trying to overcome casing trouble with a hole full of oil from three feet of Arbuckle limestone at 3388 to 3391 feet. Early showings in this test have caused operators to believe that it will be among the larger completions if the trouble is successfully overcome. The first important showing was encountered at 3028 to 3035 feet and from 3095 to 3098 feet, it was estimated good for about 4,500,000 cubic feet of gas. It is understood that in attempting to cement through tubing, operators permitted cement to set inside the tubing from bottom to within a

few hundred feet of the derrick floor. Latest reports indicate that the string has been cleaned out and that operators have been able to run a swab through the tubing.

Tom Palmer et al's Tasek 1, CSE Section 3-14s-11w, wildcat test in eastern Russell County and in the northern portion of the Barton-Ellworth Arch, set 6⅝-inch casing at 3317 feet and was cleaning out preparatory to testing when water broke in from behind the pipe. This test topped the conglomerate at 3260 feet and should be in or near the top of the Arbuckle limestone at the present depth. Casing will be underreamed and reset for a water shutoff.

## Two Important Oklahoma Wildcats Fail to Show in Objective Sands

Tulsa.—Two important Oklahoma wildcats failed during the last week to show in the formations from which they were expecting commercial production and both probably will be abandoned, although one is being plugged back to further test upper formations. Barnsdall Oil Corporation et al's Community-Taylor 1, CSW NW Section 17-14n-5e, a co-operative test in east central Lincoln County, topped the first Wilcox sand at 4706 feet and had about 4000 feet of water in the hole at 4728 feet, still in the sand. After going out of Wilcox at 4735 feet five feet of dolomite was drilled and the bit entered second Wilcox. With a penetration of four feet into this member, the hole stood full of water with no oil or gas showing. The hole was plugged back to Hunton lime, where a saturated core had been obtained. Ripping the pipe from 4525 to 4540 feet, resulted in 2400 feet of water. It will be plugged back to Peru sand to test a showing logged between 3551 and 3620 feet. Although a saturated core was obtained from this formation, operators are not hopeful that the test will make a well.

The second test to blast hopes of the operators was W. H. Adkinson et al's Hayes Estate 1, SE SE NE Section 24-28n-3e, approximately two miles northeast of the old Mervine pool in northeastern Kay County. After finding the upper sands running slightly higher and thicker than in nearby tests, operators here found only one foot of sand, 3215 to 3216 feet, at the stratigraphic position of the Bartlesville or Burbank sand. This despite the fact that a dry hole less than a mile to the southeast found 24 feet of sand and had 1200 feet of oil standing in the hole when it was abandoned. Upon failure to find production in the Bartlesville sand, drilling was continued to 3310 feet, two feet in the true Mississippi limestone. Top of the Mississippi chat was logged at 3294 feet. It is being plugged to abandon, no showings having been found sufficiently important to warrant testing the upper formation.

## Consider Under Run Situation in Oklahoma City Allowable

Oklahoma City.—Daily allowable production from the Oklahoma City pool was increased from 94,000 to 102,000 barrels for the period March 1 to 15. This action by the corporation commission came as a result of the hearing of last week when most of the major purchasers indicated an increased demand through their nomination for this period. The commission set March 12 as the date upon which they will receive nominations for the second half of the month. Allocation of allowable production under the new order was made as follows:

Wells producing from the Arbuckle lime zone, 4000 barrels, a decrease of 1000 barrels below that allowed under the preceding order; 87 water wells outside of the lime zone, 100 barrels exemption each, or a total of 8700 barrels; one and one-half per cent to deferred under-production which was estimated at 2,896,636 barrels as of February 1, or a total of 43,450 barrels; 10,000 barrels to current under-production which is estimated at about 150,000 barrels as of March 1; one half of one per cent on 660 wells having an estimated potential of 3,218,456 barrels, or 16,092 barrels; 16,500 barrels based on 25 barrels exemption for 660 eligible wells; and 3300 barrels for new wells; making a total of 102,042 barrels.

Field Umpire Ray M. Collins reports that connections have been arranged for most of the wells which were without outlet and that every effort will be made to wipe out the under-production and under-run situation which gained such large proportions during the past few months. Collin's plan is to eliminate any current under-production by special allowances during the succeeding period as is done in the last order. Under the present allowable of 43,450 barrels to deferred under-production, 66 days would be required to place the field on production par, but operators and the umpire staff are hoping that this may be accomplished in shorter time by continued increase in demand.

Late in March a statewide proration meeting will be held to redetermine demand and allowable for all flush fields in the state. Since Seminole has suffered but little during the recent falling off of demand for Oklahoma oil it is believed that most of the increases in nominations during the next few weeks will be for Oklahoma City crude. It is expected that during the statewide meeting the question of inequitable taking as between Seminole and Oklahoma City may be one of the big issues.

## Sinclair-Prairie Merger Approves

**TULSA.—Formation of Consolidated Oil Corporation became a reality March 1 when stockholders of Sinclair Consolidated Oil Corporation, Prairie Oil & Gas Company and Prairie Pipe Line Company voted in favor of one of the outstanding mergers of the petroleum industry. Sinclair stockholders met in New York and approval was but a formality. In Independence, Kansas, stockholders of Prairie Oil & Gas Company made approval little more than a formality.**

**When late in the afternoon no report came out of the meeting of stockholders of Prairie Pipe Line Company there was apprehension, but the final count of proxies revealed a majority of 88.17 per cent of the stock of this concern favored the merger. There was organized opposition from Prairie Pipe Line Company, with an element of its shareholders opposed to a merger except on condition that a cash distribution be made from the surplus of the company. An injunction asked in Federal District Court was denied last Saturday in Topeka.**

**Threats have been made that further efforts will be made to prevent the merger of Prairie Pipe Line Company, but the safe majority at the special meeting would indicate little further trouble in welding together the three concerns. Kansas statutes provide that 80 per cent of stock approve a merger and in each instance the Prairie concerns voted well over the requirement.**

**While there has been doubt about completing the merger at this time, its approval leaves the Mid-Continent oil fraternity wondering how Consolidated Oil Corporation will be set up as to headquarters and personnel. Present indications are that the producing division will have headquarters in Tulsa and that the transportation division will remain at Independence, where both Prairie concerns have had headquarters. The sales and refining divisions are scheduled to be centered in Chicago.**

# New Mexico and Rocky Mountain Area

## Test Reveals Hobbs Well With 22,000-Barrel Potential Flow

Hobbs, N. M.—Potential production of the Hobbs field took a substantial boost last week when Continental Oil Company's State 6-A, located at a high point on the structure, SWc Section 33-18-38, flowed at rate of 21,939 barrels of oil and 20,289,000 cubic feet of gas daily via open tubing and casing from regular lime formation at 4010-4155 feet. Prior to the taking of this official gauge by Umpire C. G. Staley the well had been allowed to clean itself into pits, and only showed 5/10 of 1 per cent b. s. and water.

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Farmington, N. M.—Continental Oil Company's second try for oil production in the Deleware sand horizon on Rattlesnake Dome, San Juan County, had approached a decisive stage early this week. This company's Munoz-Rattlesnake 24 was drilled to 6795 feet, and will be cored deeper after having failed to show commercial production when sand tester was run over the week-end. Munoz-Rattlesnake 17, located on the same permit, which is owned jointly with Petroleum Finance Corporation, discovered production in the Delaware in April, 1929, at 6769-6771 feet, and flowed approximately 350,000 barrels of high gravity oil before being flooded with water. The latter is standing at 6961 feet awaiting the outcome of efforts to cement off a bad cave.

## Utopia Structure Wildcat In Montana Drilling Below 2700 Feet

Chester, Montana.—The California Company's wildcat well on the Utopia structure has resumed drilling below 2700 feet after having set 10-inch pipe at 2608 feet to shut off two Colorado shale water sands. This test is the second to be drilled on the structure, the first having been started by the Utopia Oil Company and completed by The California Company.

A very good showing of gas seemed apparent in the first test in spite of the fact that the hole was full of water which it proved impossible to shut off. The second test was started with the idea of making a test of the Ellis formation after a good water shutoff in the Colorado had been effected. Either oil or gas or both may be expected in the Ellis. The structure is in Liberty County on SE SE Section 3-33-6e.

## Dry Creek Field, Montana, Lists Three Active Drilling Operations

Red Lodge, Montana.—Operations under way in the Dry Creek field, Carbon County, are all making good progress. The Ohio Oil Company's test on the Montana Industrial lease, Section 11-7s-21e, is drilling below 1520 feet, while the No. 2 Robinson on Section 3 is rigging up. The Robinson well is a direct offset to the company's No. 1 Chapman, one of the best completions in the field.

Carbon Oil & Gas Company's well on Section 7-7-22, in the eastern extension of the field, is drilling below 1260 feet. This company has one shut in producer which had an initial production of 1934 barrels in 32 hours from the Lakota sand at 5601-5656 feet. The discovery well in the field was drilled by the Ohio Oil Company. It was good initially for 2000 barrels at 5393-5412 feet in the Dakota.

## Illinois Pipe Line Company Will Lay Eight-Inch Line in Wyoming

Byron, Wyoming.—A four-mile eight-inch pipe line is to be laid by Illinois Pipe Line Company from the Byron-Garland fields, in northern Wyoming, to connect with its trunk line from the Elk-Basin field to Chatham, Wyoming. The new line is to care for the Ohio Oil Company production from these two important black oil fields in the northern part of the state.

A pumping station is being installed in the field. The Ohio Oil Company is cutting down an 80,000-barrel steel storage tank at Illco and moving it to the pump station at Byron. Another tank of this capacity also will probably be sent to Byron.

## Midway and North Geary Structure Prospecting Begun by Syndicate

Casper, Wyoming.—Mutual Oil Syndicate has started building steel derrick for its test on the Midway dome structure, nine miles north of Casper, on SW SE Section 14-35-79, on a 40-acre offset lease northwest of the discovery well. This is the first test of what promises to be an extensive drilling program on the Midway and on the North Geary structure, the first lying directly north of Casper and the second to the northeast.

Mutual Oil Syndicate is headed by Sidney H. Keoughan, founder of Continental Oil Company. He is backed by New York City, Boston, and Chicago capitalists, 20 of whom visited the field and Casper last week.

## Important Golden Dome Structure Test Is Drilling Below 2615 Feet

Red Lodge, Montana.—The Ohio Oil Company's interesting rotary test on the Golden Dome structure, in southern Carbon County, is making good progress below 2615 feet in the Frontier formation. Contract has been let to the Rocky Mountainn Drilling Company, which is furnished electricity for power by Montana Power Company. Because of the similarity and proximity of Golden Dome to the Dry Creek field, the test at Golden Dome is particularly important.

## Montana Wildcat on Liberty Dome Increases Oil Show With Depth

Great Falls, Montana.—The wildcat well on the Liberty Dome structure, in Liberty County, No. 1 Yurman, which is being drilled by the Northland Oil & Gas Company, reports more oil showing as greater depth is attained in the shale. It is not expected that commercial production will be obtained, however, until a sand is encountered. Last reported depth is 3800 feet. This test was delayed considerably by the necessity of making repairs to the rig and the band wheel.

# East Central Texas Field Notes

**H. H. KING,** ***Staff Representative, Fort Worth, Texas***

## Van Completes One Producer, One Failure; Field Work Quiet

Tyler, Texas.—An oil producer and a dry hole were added to the Van field unit block during the past week. The only new location staked during this period consists of an outpost test on the north end of the field, being in the southwest corner of Humble Oil & Refining Company's J. F. McPherson 72-acre lease, Wm. Daniel Survey.

The Texas Company's J. A. Bracken 3, located on 48-acre lease in the prolific section of the field, gauged 101 barrels per hour via 11/16-inch choke on 2½-inch tubing from regular Woodbine sand at 2470-2931 feet. The failure was credited to Pure Oil Company's D. F. Cade 1, which was originally scheduled to make a try for shallow production in the Nacatoch sand on the northwest side of the producing area. Drilling was halted in shale at 3150 feet. Only traces of oil were found in coring the Nacatoch sand, where production was desired to perpetuate leases on acreage lying outside the area capable of producing from the Woodbine sand. This move was made should a new deep horizon be given the area by Pure Oil Company's Davis 1, which is drilling below 7218 feet in sand and shale formation identified as the lower section of the Trinity series.

## Moving in Heavy Rotary for Important Fault Line Wildcat

Tyler, Texas.—Heavy rotary rig has been ordered moved in to start drilling promptly on Geo. Greer, William C. McGlothlin and associates' wildcat block situated on a pronounced fault in northeastern Rains County. This operation is rated as being the most interesting now pending along the Central East Texas fault zone. Woodley Petroleum Company and Wheelock & Collins each acquired a one-eighth undivided interest in the 12,000-acre block and a free test to 4000 feet, or to the Georgetown lime horizon, last January for $15,000 cash, thus assuring the promoters a return of $30,000. The latter two concerns also obtained a substantial block of royalty interests, and agree to pay $5000 additional each should oil and gas showings be encountered in sufficient quantity to justify running a string of pipe.

Greer-McGlothlin et al's wildcat test will be located 150 feet out of the southeast corner of the Roy Harper 100-acre tract, David Rose Survey, and northeast of the town of Emory. D. M. Lide of Shreveport, and Walter S. Jackson participated in the blocking of the acreage, and have substantial interest in the wildcat project.

Search for another oil field in Rusk County continues to occupy the attention of independent operators. Harris & Russell of Henderson, Texas, have acquired a 1500-acre drilling block situated about six miles southeast of the discovery well of the East Texas field. Location has been made on the T. W. Harris 40-acre lease, W. C. Davis Survey, and plans are to finance the drilling of a test to the Woodbine by the sale of units. Doc. Imboden, who has been identified with a umber of wildcat operations in the district in past years, is credited with having taken over Burgoyne Bros. et al's J. A. Alexander 1, which was abandoned in Georgetown lime at 4000 feet in February, 1931, with a view of standardizing and plugging back to test a reported show of oil in saturated sand that was passed up without testing near the 3600-foot level. This wildcat is located on a 93-acre tract, Thos. Jones Survey, and about 1½ miles southwest of Henderson. Should the plugging back operation fail to yield the desired results, an effort may be made to go to the Trinity sand horizon.

Anticipated development work in general vicinity of Cranfill-Reynolds Company et al's wildcat oil producer on the M. L. Rash land, Upshur County, has not materialized. E. E. Eslick and others' Whitehurst 1, located in the southwest corner of 20-acre lease, McKinney-Williams Survey, and on a line between the above well and the East Texas field, was standing at 2435 feet late last week awaiting fuel oil. The discovery well on the Rash farm averaged 75½ barrels oil daily during the 10-day deriod ending February 23, and was dead one day. It is heading a small quantity of salt water with the oil. In order to maintain a natural flow oil is pumped into the hole and circulated at intervals.

## Producing 75 Barrels Daily Practice of Most Operators

Tyler, Texas.—Elimination of the Sunday holiday on production in the East Texas field by the major purchasers of crude has been followed by the majority of companies' increasing their takings to 75 barrels daily so as to coincide with well allowables authorized by the Texas Railroad Commission and military authorities, who are acting under direct orders of Governor R. S. Sterling.

Sinclair Refining Company announced its intentions of producing and buying 75 barrels daily from all wells served by the Sinclair-Texas Pipe Line Company effective February 25, and since this date Sun Oil Company, The Texas Company, Humble Oil & Refining Company, Yount-Lee Oil Company, Shell Petroleum Corporation and Gulf Pipe

## East Texas Production

Official data on proration enforcement in the East Texas field, as compiled each day by the military authorities, is listed below for the past week:

| Period ending 7 a.m. | Total wells completed | Wells reporting prod. | Wells not reporting: Wells off prod. | Wells not reporting: reporting | Pipe line runs | Total production | Daily average per well |
|---|---|---|---|---|---|---|---|
| February 21 | 4222 | 3956 | 50 | 216 | 343,656 | 287,025 | 72.6 |
| February 22 | 4229 | 2874 | 931 | 424 | 69,944 | 198,362* | 69.0 |
| February 23 | 4245 | 4085 | 48 | 112 | 182,844 | 291,594 | 71.1 |
| February 24 | 4261 | 4000 | 56 | 205 | 304,428 | 293,967 | 70.1 |
| February 25 | 4270 | 4002 | 49 | 219 | 420,790 | 280,550 | 71.0 |
| February 26 | 4288 | 3986 | 31 | 271 | 361,158 | 290,385 | 72.8 |
| February 27 | 4305 | 4120 | 37 | 148 | 326,863 | 292,903 | 71.1 |
| February 28 | 4316 | 4165 | 45 | 106 | ..... | 304,329 | 73.0 |

*Production off because of Sunday shut-down observed by some companies.

Note—Pipe line runs include receipts plus crude used as fuel and road oil and for washing in wells.

Line Company have followed suit. Magnolia Petroleum Company deferred action on raising its nominations from 65 to 75 barrels daily, but is expected to fall in line sometime this week.

No further efforts will be made to have one off day on production each week by the purchasers adhering to the posted price, as such practice has yielded large quantities of distrissed priced crude through producers flowing wells on Sunday and turning the oil to local refineries at whatever price obtainable. Proration violations have been greater through operators' claiming surplus oil sales to be the result of accumulating Sunday output of wells refused by major buyers.

That a good demand for East Texas crude has again put in its appearance is borne out by the fact only one application for pipe line connection was presented to military headquarters last week, and the well connection committee cancelled its usual meeting.

## Two Sales of Production in East Texas Field Recorded During Week

Tyler, Texas.—Approximately 800 acres held under lease jointly by Adams and Lyles, Moody-Seagraves interests, and Kirby Petroleum Company in the west portion of the M. V. Pena Survey, located on the southeast edge of the East Texas field, have been turned to Walter H. Gant of Ardmore, Oklahoma, and associates for $1,000,000 payable entirely from production. In addition to assuming this oil payment, which involves $200,000 payable from one-half of the first production, and $800,000 payable from one-fourth of the remaining production, Gant and others are to drill 10 wells at intervals.

Gulf Coast Oil Company of Houston is reported to have contracted to sell its five producing leases on the Giles, Thrash, Toliver, Deason and Thompson farms, located in the Rusk County section of the East Texas field to the Ortis Oil Company (Staley and Wynne) of Wichita Falls for a cash consideration of $146,000. There are nine completed oil wells involved in this deal.

## Magnolia Installing Pumping Equipment on East Texas Wells

Longview, Texas.—Installation of pumping equipment has been undertaken by Magnolia Petroleum Company in East Texas on a large scale with a view of providing work for veteran field employes and also to be prepared should the flowing life of its wells be terminated earlier than anticipated. This company is providing labor for approximately 120 field men that otherwise would be dropped from the payroll. This company's development program had been reduced to four active drilling operations at the close of last week, with 250 completed oil wells to its credit.

Magnolia Petroleum Company has six producers in the field that require pumping to recover their daily proration allowable. Installation of pumping equipment has reached various stages of completion on 54 wells, including 15 that are listed as being fully equipped. The pumping wells are identified as Dick Wells 2 and 5, Kilgore area, and Dan Kelly 1 to 4 inclusive, Joiner area.

The 126-foot steel drilling derrick is being replaced by second hand steel pumping derricks of the stub variety that have seen service in other fields. This substitution provides work for a large number of rig builders, and requires considerable trucking. Concrete foundations and floors are installed as each well is standardized for pumping on the beam. Magnolia Petroleum Company has more than 400 gas engines obtained through the abandonment of properties elsewhere for use in equipping its East Texas pumpers, and does not contemplate using any central power hookups.

## East Texas Acreage Trades Reduced to Lowest Levels

Longview, Texas.—Trading in producing properties and undeveloped leases in the East Texas field has dropped to a low level since it became apparent that proration allowance per well will be held to a maximum of 75 barrels daily for an indefinite period. Two transactions of interest were consummated during the past week.

W. W. McDonald and R. B. Campbell, Dallas operators, acquired a 15-acre lease out of the J. W. Harrison (Magrill) farm, G. W. Hooper Survey, Gregg County, with one completed well for a cash consideration of $55,000, including $5000 brokerage fees, from Eastland Oil Company, Jack Greenwood and Adams & Lyles. Each of the latter held one-third interests in the property, which was originally sold to H. W. Elliott et al, and later reverted back to the trio. The producing well involved in this deal was completed by Elliott et al last June.

Stroube & Stroube, Corsicana operators, are credited with having paid $10,000 cash and an additional $5000 to be paid from one-fourth of the first production for lease on five acres out of Byrd & Frost, Inc.'s M. B. Hughey 110.4-acre lease, L. B. Outlaw Survey, Gregg County. This property is on the east edge of the Kilgore area.

## Leaking Casing Provides Shallow Production Prospect

Longview, Texas.—Shallow drilling operations are being contemplated by some of the lease owners in the vicinity of the southwest corner of the David Ferguson Survey portion of the East Texas field with a view to obtaining oil production from the 800-foot horizon. This sand horizon has become well saturated with oil through migration from a nearby well that has a split joint of casing. The well credited with being the source of this migratory oil was completed last September as a big producer in the Woodbine by a small independent company, which became involved in a receivership when state conservation authorities demanded that the producer be killed and the casing reconditioned. Those in charge of the well have successfully sidestepped the conservation order through buck-passing tactics.

## Contract Is Let for Drilling Test in San Jacinto County

Houston.—Contract has been made by the Seven Wells Corporation of Texas, which maintains headquarters at Fort Worth, to sink a deep test on a 4000-acre wildcat drilling block centering on the H. A. Alsbury Survey, San Jacinto County, and about six miles south of Cold Springs, or two miles southwest of Shepherd. The wildcat will be located on land owned by Foster Lumber Company, and near the center of the above survey. P. A. Wiley, Tyler drilling contractor, will have charge of operations. The contract calls for a 4000-foot test, but provisions are being made to go to 5000 feet, if necessary, to explore the oil and gas horizon recently uncovered in Montgomery County, which adjoins San Jacinto County on the southwest.

## East Texas Proration Objectors Encouraged by Injunction

*(Continued from page 12)*

production ownership during title correction period. Many of the local refiners wave such requirements when crude is offered at sacrifice prices. The so-called Sunday holiday production has been available to plants at prices ranging from 30 to 50 cents per barrel, depending upon the transportation charges, and at such costs a profit is possible for the skimming plant owner. This principal source of distress crude will not be available to the plant owners after field stock tanks are emptied, owing to the majority of the purchasers having cancelled the sixday week buying plan.

### Plight of Skimming Plant

The plight of the skimming plant owner is illustrated by the accompanying table that gives the average recovery made from a barrel of crude, and the revenue derived from each commodity, based on current market quotations. Most of the plants are turning out a fuel oil that tests about 27° gravity in order to market same with nearby drilling rigs at an average price of 50 cents per barrel. To make a deeper cut from this fuel oil would leave a very high cold test product that could not be handled without heating. Allowing five cents per barrel for pipage, and 10 cents per barrel for processing a barrel of crude, the average skimming plant owner in East Texas stands to lose about 14½ cents per barrel when the posted price is paid for the oil, and the products disposed of at current quotations.

Anti-prorationists present the argument that a ready market is available for the East Texas field's flush output through purchasing agencies already established with trunk lines, supported by purchasers from distant refining centers, and also many foreign countries. The former are of the belief that they will make more from their properties by extracting the flowing life in short order and taking whatever price may be obtainable, with hopes of a quick rebound on the price postings when the field assumes a pumping status. A return of pre-military prices of five and 10 cents per barrel for crude is admitted as being inevitable should the field be thrown open for competitive production withdrawals. Transportation is available for the movement of 1,000,000 barrels of crude daily from the field for a limited period, then the outlet would be curbed only because of exhaustion of available storage facilities.

### Some Majors Want Lid Off

Officials of major companies are not entirely unanimous in their views on retaining the lid on East Texas production, as some have expressed themselves as believing that their respective companies are entitled to the privilege of replenishing at rock bottom prices crude stocks that actually cost double and more the return gained from same in reducing inventories within the past two years. The East Texas field is the most likely source of such a wish materializing should restraining orders not be made permanent by the courts against operators now challenging the state's proration rules.

Estimates have been made that the East Texas field would possibly yield 200,000,000 barrels of oil under natural flow within 200 days, then be void of all flush production. The field would have 5000 wells at the end of that period after making allowances for new additions and casualties brought about by the rise of the water table. Installation of pumping equipment would restore the field to its former position of being a disturbing factor, as it will pump an average of more than 100 barrels daily per well on an average for considerable time after the flush is depleted. Limitation of production to 100 barrels daily per well would net 500,000 barrels daily, and no market could be located for a reasonable portion of the above figure should the leading purchasers' storage tanks be filled with distressed price oil.

**Refined products normally extracted from a barrel of East Texas crude by the local skimming plants are listed below, with the average percentage of recovery per barrel, and market value, based on current spot quotations:**

| Products | Yield Percentage | Yield in Gals. | Value Per Gal. | Total Revenue |
|---|---|---|---|---|
| Gasoline | 38 | 15.96 | $.03 | $.4788 |
| Fuel oil | 40 | 16.80 | .0125 | .2100 |
| Kerosene | 10 | 4.20 | .02 | .0840 |
| Distillate | 10 | 4.20 | .015 | .0630 |
| Loss | 2 | .84 | .. | .... |
| Total | 100 | 42.00 | .. | $.8358 |

**East Texas refiners that pay the crude price scale posted by major companies have the following fixed overhead, more or less, to bear in running the average barrel of crude through their plants:**

| | |
|---|---|
| Crude cost at well | $.83 |
| Pipe line charges | .05 |
| Refinery operating expense | .10 |
| Total | $.9800 |
| Revenue from refined products | .8358 |
| Loss per barrel | $.1442 |

Contrary to expectations on the part of some operators in the East Texas field that crude purchasers patronizing the market last spring and summer when production was on a semi-restricted basis will resume wholesale buying, it is apparent that many of these buyers now have big investments in the field. Protection of these investments from unequal drainage will naturally be the first move made by such companies, and the acceptance of outside oil will not be needed, as the scope of drainage for a structurally high well in the field is almost unlimited.

Unless permanent court relief is obtained by operators seeking to discard orderly production, indications are that definite plans are on foot to allocate to the East Texas field a fixed quota of crude oil demand offered by the market, and permit other fields to enjoy such protection, with prices remaining somewhat stable. Few if any fields can compete with the East Texas area for a lion's share of the available market lying east of the Rocky Mountains because of unusual transportation arrangements enjoyed by the former area, and comparative low drilling costs.

## Big Lake Crude Residue Gets Attractive Price as Lube Stock

Texas City, Texas.—Initial tanker shipments are to be made shortly by Republic Oil Refining Company on contract made recently to supply Gulf Refining Company with 3000 barrels of residue stocks daily for a period of one year. The former concern's refinery at Texas City is operating on uncontaminated crude produced by deep wells in the Big Lake field, West Texas, this crude yielding a high percentage of exceptional quality lube oil stocks. Republic Oil Refining Company's plant is not equipped to manufacture lubricating oil, and has been solicited by a number of major companies for the bottoms remaining from its operations on Big Lake crude.

# North and West Texas Field Notes

**H. H. KING,** ***Staff Representative, Fort Worth, Texas***

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## Seek Removal of Restrictions On Howard-Glasscock Pumpers

Fort Worth, Texas.—Removal of proration restrictions on pumping wells making a high percentage of sulphur water in the Howard-Glasscock County district, West Texas, was sought by some of the operators during a hearing conducted here February 23 by R. D. Parker, chief supervisor of the oil and gas division of the Texas Railroad Commission. Action was deferred to await the outcome of an experiment to be made in cementing off water supposedly coming in from above the lime pay horizon, and also to make a canvass of the crude purchasers to determine the maximum market outlet.

The Howard-Glasscock area enjoys a proration allowance of about 26,000 barrels daily, and the potential is rated at 73,000 barrels daily, but the actual maximum yield is believed to be under 40,000 barrels daily should the wells remain on steady production each day. Indications are that within 30 days a market demand will prevail for all the production that this field can yield, as local refineries propose to increase their purchases, while Humble Oil & Refining Company and Shell Petroleum Corporation have indicated a willingness to absorb more of the oil.

George Sawtelle, vice president and general manager, Kirby Petroleum Company, Houston, was one of the strongest contenders for a more liberal proration allowance, or elimination of restrictions entirely, on wells making water. Testimony was given that wells in the west extension of the field are now handling large quantities of water that has broke in from porous formations above the oil horizon and below the casing seat. An experiment is to be conducted by the Halliburton Oil Well Cementing Company in trying to check this upper water encroachment upon one of the wells owned by Kirby Petroleum Company. Plans are to try and force the cement back into the formation to seal off the water. Pending the outcome of this test no action will be taken by the commission, according to Parker, who announced that another hearing will be held in Fort Worth March 21.

## Big Lake Operators Trained To Kill Deep Wells Promptly

San Angelo, Texas.—Experience gained in past months in handling high pressure oil and gas wells producing from the 8500-8900-foot lime horizon in the Big Lake field enables drilling crews on duty in this area to get prompt results when the occasion arises to kill the flow of such wells. Group One Oil Corporation's (Continental Oil Company) University 2-B, which ranks as the biggest oil and gas producer of the nine deep wells in the field, was killed on the morning of February 26 within an elapsed period of 30 minutes after heavy rotary drilling fluid was pumped into the hole under 1600 pounds back pressure. This well has a total depth of 8740 feet, and produced 11,035 barrels of oil, testing 47.7° gravity at 51 degrees temperature, and in excess of 100,000,000 cubic feet of gas during the 24-hour period prior to the killing of the flow to insert tubing. Approximately 1300 pounds back pressure was applied to the casing during this gauge in an effort to retard production.

University 2-B is being equipped with a combination string of three and four-inch tubing, with 750 feet of the smallest size swinging near the bottom of the hole. A sharp reduction in the gas flow, and also a cut in the oil yield is to result from the installation of this tubing string, as greater back pressure on both casing and tubing can be safely applied when the well is restored to production under such conditions.

The same general horizon that provides spectacular wells in the Big Lake field is the goal of two wildcat tests being drilled in Irion County. Stanolind Oil & Gas Company's W. H. Williams 1 was drilling with rotary below 7315 feet late last week, and Plymouth Oil Company's (Benedum-Trees et al) J. D. Sugg 1, was making progress below 6565 feet.

## Plan Deep Test on Large Block Of Leases in Archer County

Wichita Falls, Texas.—Having obtained deep production rights on a block of approximately 5200-acres in south central part of Archer County, W. B. Hamilton of Wichita Falls and associates plan to make a 4000-foot test, or to the top of the Ellenberger lime, and also three tests to the Canyon lime horizon, which has been found productive in the Chalk Hill pool. The deep test is scheduled to be drilled in the southeast corner of the Samuel Swartweat Survey, abstract No. 197, and several miles northwest of Anarene.

A magnotometer high is reported to have been established on the above block of leases. Work on the block has been underway for more than a year. Such a large block would have been most difficult to obtain should lease activity have remained near its normal level.

Withdrawal of the Panhandle Refining Company from active crude buying in North Texas, has been announced effective March 1, and crude runs to its refinery at Wichita Falls will be curbed about 50 per cent. This company owns and controls about 900 barrels of production in the district, and will confine its plant operations to such crude supplies until a more favorable refined oil market appears. Such a policy has been adopted rather than to try and introduce a crude price reduction in the district. Some plants have elected to pay less than the posted price for crude in order to remain in operation during the unfavorable market period.

## Texas Pipe Line Consolidates Two Districts at Wichita Falls

Wichita Falls, Texas.—Activities of The Texas Pipe Line Company in North Texas and Central West Texas have been consolidated and placed under the jurisdiction of O. R. Burden, district superintendent, who maintains headquarters here. E. E. Weller, who has been chief clerk for the Central West Texas district with headquarters at Fort Worth, has been transferred to Wichita Falls to serve in the same capacity. A district office will continue to be maintained at Fort Worth, with J. B. Haden, superintendent in charge. The Texas Pipe Line Company is the largest transporter of crude in the above two districts, which have approximately 23,186 producing wells listed on current proration reports.

# South Texas Field Developments

**EARL POST,** ***Staff Representative, San Antonio, Texas***

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## Jim Wells County Gas Producer Extends Armagosa More Than Mile

San Antonio, Texas.—Gulf Production Company's Schaeffer 5, wildcat in northwestern Jim Wells County, has completed as a gasser after being plugged back to 2427 feet from 3044 feet. This well provides a 1¼ mile extension to the Armagosa field or opens an entirely new pool.

The test is 1000 feet from the south and east lines of survey 89 and 1000 feet north of Carsil Oil & Gas Company's McGill tract, on which is located the only gasser in the immediate sector.

First indications of a gasser came when the well had gas blow-out on January 28. A drill stem test from 2364 feet to the bottom of hole at that time, which was 2457 feet, was dry. The tool was pulled back and set at 2348 feet, showing 450 pounds pressure in six minutes. This indicates that the production is coming from somewhere between 2348-64 feet.

The well was plugged back with heavy mud. A string of 155 feet of perforated four-inch liner was set in the bottom of the hole with a packer and 2272 feet of 2½-inch tubing run into the hole. It had a shut-in pressure of 900 pounds and a working pressure of 690 pounds on three-eighths-inch choke when brought in. While the volume has not been gauged, the well is estimated at 30,000,000 cubic feet.

Carsil's McGill 1, D. Baldwin Survey, was drilled through a lime cap at 2681-83 feet and went into a sand at 2683-89 feet early in March, 1931, the well blowing in wild, making an estimated 50,000,000 cubic feet of gas. It showed some salt water after being out of control several days and was abandoned. McGill 3 made a producer at 2770-2804 feet, good for only several million cubic feet daily. It was south and east of the discovery. The McGill wells found a sand around 2400 feet, which might be the same as in the new producer. The sand, however, was dry.

## Plan Installation of Tapered Tubing in Pettus Field Wells

San Antonio, Texas.—A production test with tapered tubing will be made in the southwestern portion of the Pettus field, Bee County, by Atlantic Oil Producing Company and Buck Oil Corporation. Tubing for the wells arrived February 29 and was to be installed immediately.

Buck Oil Corporation owns three wells on a 100-acre lease of the Ray Ranch, John Williamson Survey, in the extreme west end of the pool. Atlantic Oil Producing Company has engineers on the lease to supervise the work and watch the test, which will probably last 30 days.

The third Buck well was completed during the past week for 400 barrels initial from 3897-3905 feet.

T. B. Slick Estate's Ray 4, Kerr Survey, was the only other producer in the field. It is a gasser, spraying 30 barrels of oil. The well has 790 pounds pressure on the casing and 780 pounds on the tubing through small chokes. The well, the most northeasterly producer in the extension pool, has the sand from 3906-12 feet. Same operator's Ray 5, in the western portion of the lease, had the cap from 3882-84 feet and cored a sandy shale to 3885 feet and is now coring deeper.

A couple of dry holes, which will further define the field, apparently are in the making. J. M. Davis et al's Ray 1, 1000 feet southwest of the Damac producer, is drilling at 4100 feet after coring a sand at 3952-63 feet, which showed salt water. Houston Oil Company's J. F. Portis 4, A. Smalley Survey, most easterly well in the pool, is coring at 4123 feet, apparently too low for a producer.

## Escobas Area Extension Well May Mark Separate New Pool

San Antonio, Texas.—A new pool or a two-mile extension to the Escobas area, Zapata County, was provided by K. & M. Oil Company (Herb S. Morgan) in Trevino 1, showing for a large gasser. The well topped the sand at 1498 feet, drilled to 1508 feet and set 6⅝-inch casing on top of the pay. It is now being drilled in.

The well is 150 feet from the north and west lines of block 7, Survey 13, two miles east of the Escobas field; there is a strong possibility of a connection. The Montemayor producers drilled by Daniels & Hill and by S. R. C. Oil Corporation in the recently discovered second pay in the northern end of the Escobas field find oil from 1469 to 1480 feet.

## Owen Elected President San Antonio Geologists

San Antonio, Texas.—Edgar W. Owen, representative for the Wentz Oil Corporation in San Antonio, was elected president of the San Antonio Geological Society at its annual meeting in Corpus Christi February 26-28. He succeeds Herchel H. Cooper, also of San Antonio, who remains on the board of directors.

Olin G. Bell, district geologist for Humble Oil & Refining Company, Laredo, was elected vice president. Charles A. Stewart, district geologist for United Production Company, was elected secretary and treasurer. Thornton Davis, manager for the Simms Oil Company, also of San Antonio, was elected to the board of directors.

More than 200 were in attendance at the meeting. While the major part of the delegation came from the South Texas area, a number of visitors came from Tulsa, Fort Worth, Dallas, Shreveport, Houston, San Angelo, Kansas, etc.

—Powell Studios
EDGAR W. OWEN

# Gulf Coast Field Developments

**JACK LOGAN, *Staff Representative, Houston, Texas***

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## Lost Lake Well of Pure Oil Company Gets Another Showing

Houston.—The Pure Oil Company's Mayes 14 at Lost Lake, Chambers County, a flank test which recently failed to develop commercial production from a new sand discovered at 1831-73 feet, has encountered a slight showing of oil in sand, shale and shell at 2730 feet. In the event the showing becomes richer with increased depth, the well probably will be tested.

## Completion of Second Manvel Well Is Due Early in March

Houston.—On March 2 The Texas Company was due to attempt completion of Belcher 2 at Manvel field in Brazoria County, Texas, at 5572 feet, or a depth 22 feet shallower than completion depth of the discovery well of the field.

Belcher 2 is 1000 feet southeast of the discovery well. It set and cemented 9⅝-inch casing at 5550 feet, and on March 1 was building a manifold.

## Gulf's Test Will Determine Richness of Port Barre Sand

Houston.—Gulf Refining Company's Wilson-Cochran 1 in the Port Barre district of St. Landry Parish, Louisiana, will be watched closely for the next few days to determine the richness of a showing of oil encountered at 3158-95 feet. Casing has been set above the showing and the plug is scheduled to be drilled as soon as the cement will stand it.

This test is in Section 4-6s-5e, 1490 feet east of The Texas Company's Botney Bay 5. It was spudded February 5.

Port Barre Oil Company's Sibille 1, 800 feet south and 124 feet east of the northwest corner of its tract, in Section 20-6s-5e, is drilling below 650 feet after having set 10-inch casing at 630 feet.

*Because of the ground being soft following rains, Heep Oil Corporation built a corduroy roadway around the site of its semi-wildcat Montgomery County test, R. L. Cartwright 1, located southeast of Conroe and about 1½ miles northeast of the Strake Oil Corporation discovery well. Drilling is progressing below 1600 feet in the new test.*

## West Feliciana Parish Wildcat Hauling in Drill Stem to Resume

Houston.—Como Oil & Development Company's M. B. Woods 2, a West Feliciana Parish wildcat in coastal Louisiana which has remained shut down for a considerable length of time, is hauling in drill stem to resume drilling below 2875 feet. This test is located 1500 feet north and 1500 feet east of the southwest corner of Section 54-1s-4w. Formerly it was known as the Putnam Syndicate's Como Plantation 2.

## Deep Test in Evangeline Field Recovers 100 Feet of Lost Hole

Houston.—Yount Lee Oil Company's Houssiere Latrielle 10 in Section 47-9s-2w of Evangeline field, Acadia Parish, Louisiana, has retrieved the 100 feet of hole lost after a depth of 8650 feet had been attained, and is waiting orders at 8652 feet.

An attempt to set 5-3/16-inch casing was contemplated when the operators encountered difficulty in taking cores below 8650 feet. While reaming to set the string and eliminate the trouble of heaving shale the hole was lost, but eventually a string of five-inch was satisfactorily landed at 8640 feet in shale and sealed back up to 7720 feet.

Houssiere Latrielle 10, which stands a good chance of becoming the deepest producer in the Gulf Coast region, logged an oil sand at 7778-85 feet and another sand showing oil at 7858 feet. The well is located 5435 feet east and 1070 feet north of the southwest corner of the section.

## Pap Oil Company Proceeds With Drilling on Leesville Dome Test

Houston.—Pap Oil Company of Lake Charles, Louisiana, prospecting on Lot 5 of Section 26-1s-22e of the Leesville dome in La Fourche Parish, has drilled beyond 3525 feet in Esponge and Wizer 1 after encountering a showing of oil at 3480 feet, according to reports received from the field.

In the same vicinity, The Texas Company, which has been able to develop commercial production from the Leesville dome, has set 10-inch casing a little below 1000 feet in L. L. E. Leesville 4 and is waiting for the cement to set.

## East Hackberry Field Records One Producer and One Abandonment

Houston.—East Hackberry field, one of the coastal Louisiana districts which has consistently furnished flush production for the area during the latter part of 1931 and thus far this year, fell below normal performance during

the past week when its only contribution to the list of new producers had a low initial of 45 barrels.

Calcasieu Oil Company's Watkins 26, a workover, reset screen at 3000 feet and swabbed in. At latest reports it was pumping 45 barrels of net oil. The same company's Watkins 31, also in Section 13-12s-10w, was abandoned in cap rock at about 3200 feet after having penetrated 16 feet of that formation.

Two tests of Union Sulphur Company on the northwest flank of the dome at East Hackberry field are reaching interesting depths. This operator's Gulf Land Company Fee 1, Pure Oil Company lease, is drilling below 4600 feet, while the Gulf Land Company, Humble lease 1, has passed 5630 feet without a show.

## Standard of Louisiana Active On Three Iberville Parish Tests

Houston.—Standard Oil Company of Louisiana is actively at work on three tests in Iberville Parish, Louisiana, two of which are Bayou Choctaw dome prospects and one of which is at Bayou Blue.

This company's Myrtle Grove-Wilbert 2 at Bayou Choctaw, located 2040 feet north and 600 feet west of the center of Section 52-9s-11e, is drilling below 1750 feet. Its Gay 2, located 600 feet east of the southwest corner of the southeast quarter of the same section, has passed 4700 feet. Schwing-Wilbert 7, the Bayou Blue test in Section 74-9s-10e, has proceeded to nearly 4000 feet after a sand showing oil at 2544-60 feet produced salt water when subjected to a drill stem test.

## Offset to Discovery Well of Iowa District Encounters Show

Houston.—The Iowa district of Calcasieu and Jefferson Davis Parishes, Louisiana, a locality which has been closely watched since announcement by Shell Petroleum Corporation that it would drill two offsets to Vacuum Oil Company's Waite 1, discovery well of commercial production for the district, received considerable attention during the past week as a result of one of the offsets' encountering an oil bearing formation.

Shell Petroleum Corporation's Heyd 2, located 450 feet south of Waite 1 and 225 feet each way out of the northeast corner of Section 13-9s-7w, Calcasieu Parish, cored a shale showing oil at 4907-16 feet. The discovery well, it will be remembered, was first completed at 5008 feet, yielding initially 300 barrels of 28.4 gravity oil from the seven feet of sand. It was later deepened to 6971 feet, where 23 feet of screen was set to obtain an initial of 3360 barrels of 41 gravity oil.

Shell Petroleum Corporation's other offset to Vacuum Oil Company's Waite 1 is located across the line in Jefferson Davis Parish. This test, known as O. A. Fontenot 1, is an east offset, being 225 feet east and 775 feet north of the southwest corner of Section 7-9s-6w. It is drilling around 4200 feet, having recorded no announced showings to date.

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San Antonio, Texas.—Humble Oil & Refining Company's M. V. O'Conner 2, in the new district recently opened in northern Refugio County, is drilling at 1530 feet after running a string of 400 feet of 20-inch surface casing. The well is 933 feet north and 75 degrees west of O'Conner 1, and is in the J. Keating Survey.

Across the line in Victoria County, none of the wells have been started. T. B. Slick Estate's McFadden 2 and The Texas Company's McFadden 4 are rigging up.

# LOUISIANA-ARKANSAS

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## Zwolle Extension Well Flows By Heads; Another Is Failure

Shreveport, La.—Southland Drilling Company's Mansfield Hardwood 1, SW SE SE Section 36-8-13, a quarter of a mile north and west of production in the Zwolle townsite part of that field, came in flowing oil by heads at an estimated rate of 500 barrels daily, Friday, February 26, but about six hours later bridged and ceased to flow. Total depth is 2403 feet in chalk. Six-inch casing had been cemented at top of the marl at 2070 feet and chalk was logged at 2090 feet.

Another attempt to extend the southeast producing part of the Zwolle southeast field a half mile eastward ended in failure last week when C. H. Tuttle's Byrd 1, NW NW Section 7-7-10, was abandoned at 2718 feet in chalk. Service Royalty Company after bailing dry at 2812 feet is arranging to abandon Gardner B-1, SW NW Section 7-7-10, in chalk.

Two new locations were made in Zwolle last week, both outside tests in the southeast part of the area. Bahan & Morgan have derrick up for Quahagen 1, SE SE Section 11-7-11, and Sabine Production Company has derrick up for Pearce 3, NW SE NW Section 10-7-11.

Triangle Drilling Company is rigging up for Nuckolls 1, SW NE Section 7-22-12, a wildcat in north Bossier Parish, on a block of 3000 acres. These were North Louisiana's only three new locations.

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Jackson, Miss.—Five new locations were announced in Mississippi last week, four for the Jackson gas field. No completions were reported. The four new locations at Jackson were equally divided between Rankin and Hinds Counties. McGuire and associates made location for Spring Lake 1, SE NW Section 11-5-1e, Hinds County, and Meredith Drilling Company made location for Belhaven College 1, SE NW Section 35-6-1e, in the same county. Derrick is up.

In Rankin County, James Alexander, Trustee, will drill Ridgeway & McGehee 1, NE SE Section 1-5-1e, in the northeast part of the field. Rigging up is under way. Baker and associates made location for Rankinside Development 1, NW SW Section 6-5-2e. Derrick is being built.

Hercules Sulphur Exploration Syndicate has spudded Lang 2, SW SW Section 28-3s-11w, Stone County, south Mississippi, 35 miles north of Gulfport and late last week was drilling hard lime at 1764 feet.

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Shreveport, La.—Fishing jobs were under way Saturday, February 27, in both tests drilled to the lower Cretaceous in the Zwolle district of Sabine Parish. R. L. Gay, Trustee's Long-Bell A-1, NW NW Section 10-8-13, five miles north of Zwolle, which recently recovered six feet of a 14-foot core in oolitic lime of Glen Rose age from 4775-89 feet, which showed a saturation of light oil, after starting to ream out hole preparatory to setting seven-inch O.D. casing for a test of this formation hung drill stem at 1228 feet. Loring Oil Company's Bowman-Hicks 18, SW NW Section 15-7-12, eight miles southeast of the other test, was milling out at 4390 feet with drill stem and rock bit in the hole, total depth being 4500 feet.

# Completions for Past Week in U. S. Fields

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## CALIFORNIA

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| DOMINGUEZ— | | |
| Associated Oil Co., De Francis 11 | 1700 | 4430 |
| LONG BEACH— | | |
| R. R. Bush Oil Co., Brennecke 1 | 450 | 6475 |
| ROUND MOUNTAIN— | | |
| Chanslor-Canfield Midway Oil Co., No. 5 | 400 | 1665 |

## KANSAS

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| COWLEY COUNTY— | | |
| Roth and Faurot, Cavitt 1 (owd) lot 8, blk 14, Reynolds Addn, City of Winfield, 22-32-4e | 300 | 3268 |
| ELLSWORTH COUNTY—J. Robertson et al, Stratman 1, se sw ne, 1-17-10w | 1715 | 3267 |
| GREENWOOD COUNTY— | | |
| Marcus et al, McConnaughty 1, ne nw ne 36-24-12e | 30 | 1628 |
| MORRIS COUNTY— | | |
| Allender, Wycoff 1, c sw se 5-17-7e | * | 661 |
| RUSSELL COUNTY— | | |
| Signal O&G et al, Rude 2, nw se se 28-15-13w | * | 3432 |

## OKLAHOMA

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| CREEK COUNTY— | | |
| E. Shamblin et al, Wilson 1, se c ne ne 21-15-8e | ¶13½ | 1154 |
| J. H. Wright Estate, Cartwright 1, sw c2 ne sw 19-17-11e | 10 | 2418 |
| Curtis Oil Co., Barnett 1, sw c se se 18-17-10e | ¶7 | 2166 |
| Johnson O&R, Johnson 1, nw c se ne 29-19-9e | ¶13½ | 2062 |
| LOVE COUNTY— | | |
| J. B. Schermerhorn et al, Bourland 1, 1, ne nw sw 1-6s-1e | * | 1172 |
| MUSKOGEE COUNTY— | | |
| J. V. Dunbar, McIntosh 1, sw c ne se 4-15-18e | * | 1138 |
| OKLAHOMA COUNTY— | | |
| C. F. Cuniff, Trustee, St. Joseph Orph. 1, sw c ne sw se 17-12-4w | * | 6700 |
| Phillips Pet. et al, Classen 1, cwl se se nw 15-11-3w | 3990 | 6385 |
| Westgate Oil Co., Blevins 1, ne c sw sw nw 10-11-3w | 2985 | 6422 |
| Phillips Pet., Ashcan 2, cel nw ne ne 3-11-3w | 16,400 | 6284 |
| Phillips Pet. et al, Everest 1, cnl sw nw se 15-11-3w | 4810 | 6431 |
| OKMULGEE COUNTY— | | |
| O. K. Detrick et al, Stanley 1, ne c nw se 29-16-13e | ¶7 | 1758 |
| Holmes Drlg. Co., Cook 1, cnl ne sw 7-19-10e | * | 1322 |
| PITTSBURG COUNTY— | | |
| Utilities Producing Co., Church lot 1, ne nw ne 16-7-18e | ¶61½ | 1782 |
| POTTAWATOMIE COUNTY— | | |
| Mid-Continent Pet., Farmer 1, se sw nw 2-6-4e | * | 4431 |
| SEMINOLE COUNTY— | | |
| Pure Oil, Tiger 2, se ne sw 3-8-5e | 920 | 4155 |
| WAGONER COUNTY— | | |
| R. A. Godfrey, Kernal 1, ne c sw ne 7-15-17e | * | 1147 |

## EASTERN STATES

### PENNSYLVANIA

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| BRADFORD COUNTY— | | |
| Susquehanna Oil & Gas Co., McKelvey 1 | * | 6500 |
| Duff & Co., Olson 1 | * | 5690 |
| Penn-York Oil Co., Hettrick 1 | * | 5227 |
| Mosherville Oil & Gas Co., Braisted 1 | * | 4750 |
| POTTER COUNTY— | | |
| Hungerford & Co., Booth 1 | ¶8½ | 4924 |
| TIOGA-WAYNE FIELD— | | |
| Mutual Natural Gas Co., Learn 1 | ¶12 | .... |
| Workman & Co., McCollum 1 | * | 4103 |
| Penn-United Natural Gas Co., Meaker 2 | * | .... |
| Wilston 1 | ¶4 | 4072 |

***For Tabulation and Comparison See Market Section***

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| Shaler Oil Co., Gee 1 | * | 5300 |
| East Penn Development Co., Hall 1 | ¶8¼ | 4142 |

### NEW YORK

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| STEUBEN COUNTY— | | |
| Campbell & Co., Sherwood 1 | 3 | 820 |

### WEST VIRGINIA

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| CALHOUN COUNTY— | | |
| Lyle Ayers & Co., Sturms 1 | ¶¼ | 1948 |
| CABELL COUNTY— | | |
| R. H. Adkins & Co., Perry 1 | ¶¼ | 3690 |
| HANCOCK COUNTY— | | |
| R. J. Braden & Co., Johnson 1 | 2 | .... |
| MARION COUNTY— | | |
| Snider & Pense, Satterfield 3 | 5 | 2405 |
| WAYNE COUNTY— | | |
| Chartiers Oil Co., Thompson 1 | ¶1½ | 3769 |

### SOUTHEASTERN OHIO

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| JEFFERSON COUNTY— | | |
| Sanders Bros. Crawford 1 | * | 1300 |
| NOBLE COUNTY— | | |
| Gibson-Bradfield & Co., Grimes 1 | ¶¼ | 1079 |
| WASHINGTON COUNTY— | | |
| Keader Estate, Mendenhall 1 | 1 | 1205 |
| O. D. Jones & Co., Coleville National Bank 1 | ¶½ | 1271 |

### CENTRAL OHIO

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| CUYAHOGA COUNTY— | | |
| L. T. McGrath, Raible 1 | * | 2457 |
| CARROLL COUNTY— | | |
| Turner & Co., Scott 1 | * | 1222 |
| LORAIN COUNTY— | | |
| McMillan & Co., Norton 1 | * | 2377 |
| LICKING COUNTY— | | |
| Fred Eshlemann, Wilson 1 | ¶¼ | 639 |
| Emerald Petroleum Co., Moren 1 | * | 873 |
| MEDINA COUNTY— | | |
| Oko Oil & Gas Co., McVickers 36 | * | 435 |
| Barnhart & Co., Funk 7 | 25 | 377 |
| Edson & Co., Frank 36 | 60 | 500 |
| Packard 32 | * | 366 |
| MEIGS COUNTY— | | |
| The Ohio Fuel Gas Co., Martin 1 | ¶½ | 847 |
| Lisle 1 | ¶¼ | 2017 |
| STARK COUNTY— | | |
| F. A. Brendall & Co., Steiner 3 | ¶1¼ | 4275 |
| East Ohio Gas Co., Harris 4 | ¶¼ | 4385 |
| Wittmer Oil & Gas Co., Keller & Co. 1 | ¶¼ | 4020 |

### KENTUCKY

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| DAVIESS COUNTY— | | |
| Hupp, French & Co., Bratcher 1 | 5 | 565 |
| CUMBERLAND COUNTY— | | |
| Archie McGuire & Co., Highway 90, 1 | ¶2 | .... |

### MICHIGAN

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| HURON COUNTY— | | |
| Pacific Exploration Co., Ballagh 1 | * | 4000 |
| ISABELLA COUNTY— | | |
| Deerfield-Nottawa Oil & Gas Co., Smith 1 | * | 1411 |
| MIDLAND COUNTY— | | |
| The Pure Oil Co., Novak & Co. 1 | 20 | 3550 |
| Wells & Miller, Thom 1 | * | 3561 |
| MECOSTA COUNTY— | | |
| Lewis D. Mehrtins, Bauman 1 | * | 3908 |

## NEW MEXICO

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| HOBBS FIELD— | | |
| Continental Oil Co., State 6-A | ¶201¼-21,939 | 4155 |

## WYOMING

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| WESTON COUNTY— | | |
| West Osage Oil Co.'s No. 2 | 500 | 2080 |

## LOUISIANA GULF COAST

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| EAST HACKBERRY FIELD— | | |
| Calcasieu Oil Co., Watkins 26 (wo) | 45 | 3000 |
| Watkins 31 | * | 3200 |
| EVANGELINE FIELD— | | |
| Phillippi Artigus, Valle 1 | * | 1915 |
| JEFFERSON LAKE DOME— | | |
| Jefferson Lake Oil Co., Lake Peigneur 27 | * | 870 |

## TEXAS GULF COAST

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| BARBERS HILL FIELD— | | |
| Texas Gulf Prod. Co., Kirby H-9 | 1300 | 5125 |
| BLUE RIDGE FIELD— | | |
| Coronado Oil Co., Blakeley 2 (wo) | 1500 | 4500 |
| MONTGOMERY COUNTY— | | |
| Lowrie & Young, So. Tex. Dev. Co. 1 | *9 | 695 |
| RABB RIDGE FIELD— | | |
| Cullen & West and Gulf Prod. Co. Lockwood-Sharp 1-B (wo) | * | 4925 |

## SOUTH TEXAS

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| BEE COUNTY— | | |
| Buck Oil Corp., Geo. Ray 3 | 400 | 3905 |
| T. B. Slick, Geo. Ray 4 | 30 | 3912 |
| BEXAR COUNTY— | | |
| Chiquita Oil Co., Piniazek 1 | 15 | 1669 |
| F. H. Eckert, Edwards 1 | * | 1505 |
| Eckert & Son, Jno. Brehm 8 | 8 | 678 |
| Van Dyne et al, Bradden 1 | * | 825 |
| GONZALES COUNTY— | | |
| Nassamer et al, Botts 1 | * | 765 |
| JIM HOGG COUNTY— | | |
| O. W. Killam, Hinnant 1 | * | 2245 |
| JIM WELLS COUNTY— | | |
| Gulf Prod. Co., Schaeffer 5 | ¶30 | 2427 |
| NUECES COUNTY— | | |
| GULF COAST Oil Co., Sedwick 2 | 375 | 4560 |
| ZAPATA COUNTY— | | |
| F. H. Etheridge, Winch & Henne 2 | * | 1747 |

## CENTRAL EAST TEXAS

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| JOINER AREA— | | |
| S. P. Borden et al, R. G. Mason (7½-ac) 1 | 10,000 | 3674 |
| C. B. Bunte, Inc., et al, A. S. Jarvis 1-B | 9600 | 3662 |
| Golding-Murchison Oil Co., E. L. Pinkston (84-ac) 1-C | 6000 | 3711 |
| J. E. Strickland (183.92-ac) 1 | 1500 | 3675 |
| Gulf Prod. Co., W. P. Keeling 3 | 8300 | 3693 |
| J. W. Shaw (89-ac) 1 | 8000 | 3758 |
| Humble O&R Co., J. H. Arnold (20-ac) 5 | 8500 | 3793 |
| A. Scott (52½-ac) 2 | 8000 | 3791 |
| R. E. L. Silvey (125-ac) 3-A | 7500 | 3771 |
| J. Thompson (80-ac) 4 | 9000 | 3670 |
| Lide-Rowe Oil Corp., C. Young (30-ac) 3 | 6000 | 3738 |
| Mid-Kansas O&G Co., R. G. Mason (103-ac) 4 | 9000 | 3647 |
| I. P. O'Neil et al, Mayfield (200-ac) 3 | 12,000 | 3712 |
| Ortiz Oil Co., C. Young (9-ac) 2 | 7500 | 3700 |
| Hill Reade, Inc., et al, M. L. Thompson (10-ac) 2 | 9200 | 3780 |
| Reynolds (was Dunbar) et al, Cravin 1 | 8500 | 3790 |
| Sinclair O&G Co., W. H. McCord (50-ac) 1 | 7000 | 3660 |
| Tidal Oil Co., Mrs. J. M. Finney (40-ac) 3 | 2000 | 3740 |
| KILGORE AREA— | | |
| Arkansas Fuel Oil Co., M. B. Hughey-Ross (200-ac) 1 | 9600 | 3523 |
| Wm. A. Brown-Travis & C. Kroll, I. Spear (97/100-ac) 1 | 9500 | 3583 |
| Byrd & Frost, Inc., M. B. Hughey (110-ac 3) | 15,000 | 3564 |

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| Darby Pet. Co., C. O. Christian (97-ac) 4 | 11,000 | 3730 |
| Tips DeArman Producing Co., M. B. King (35.16-ac) 3 | 8000 | 3720 |
| Doss & Jones Oil Co., E. Gahler (30-ac) 3 | 10,500 | 3574 |
| Gulf Prod. Co., A. Laird 6 | 11,000 | 3627 |
| Humble O&R Co., S. S. Laird (127-ac) 15-B | 2000 | 3613 |
| Louisiana Oil Ref. Corp.-Roberts Drl. Co., W. M. Jernigan (110-ac) 1 | 12,000 | 3656 |
| Magnolia Pet. Co., S. E. Brox (84-ac) 4 | 9000 | 3653 |
| Marine Corp., L. D. Crim (30-ac) 3 | 8500 | 3580 |
| Mazda Oil Corp., L. Butts (40-ac) 2 | 7000 | 3653 |
| Jones-O'Brien, Inc., Hughey-Ross (126-ac) 1 | 13,000 | 3533 |
| A. G. Oliphant-Devonian Oil Co., W. P. Moore-Shell (98-ac) 2 | 4000 | 3780 |
| Shell Pet. Corp., J. S. Elder 3-B | 10,000 | 3564 |
| W. P. Moore 8 | 8000 | 3695 |
| Sinclair O&G Co., J. E. Lawther (320-ac) 2 | 10,000 | 3579 |
| Major Kennedy (16.3-ac) 2-A | 3000 | 3722 |
| H. R. Smith et al, Ben Laird (8-ac) 2 | 7500 | 3618 |
| Sun Oil Co., J. S. Elder (75-ac) 2 | 12,000 | 3580 |
| Tidal Oil Co., M. G. Barton (193-ac) 6 | 12,000 | 3628 |
| C. G. Strong (113-ac) 2 | 15,000 | 3645 |
| Wheelock & Collins, Dick Wells (220-ac) 7 | 8000 | 3645 |
| LONGVIEW AREA— | | |
| Alma Pet. Corp., C. D. Cox 2 | 11,000 | 3686 |
| Amerada Pet. Corp., M. Killingsworth (100-ac) 3 | 15,000 | 3595 |
| J. M. Tuttle (48-ac) 5 | 13,000 | 3560 |
| Arkansas Fuel Oil Co., D. M. McPherson (72-ac) 2-B | 10,500 | 3493 |
| Atlantic Oil Pord. Co., Wm. Anderson (83-ac) 2 | 10,00 | 3520 |
| California Pet. Corp. of Ven., J. M. Castleberry 2 | 12,000 | 3639 |
| Tuttle 2 | 15,000 | 3538 |
| T. B. Stinchcomb (87-ac) 3 | 8500 | 3714 |
| Cox & Jake Hamon, E. Lacy (50-ac) 5 | 9000 | 3600 |
| Cox & Hoffman, D. Johnson (2-ac) Blk. 10 | 13,000 | 3637 |
| Darby Pet. Co., C. C. Flements (31-ac) 2 | 8800 | 3623 |
| W. H. Ritchey (43-ac) 3 | 6000 | 3550 |
| Ellis & Dumas, Free 1 | 9000 | 3727 |
| F-H-E Oil Co., J. E. Christian (33-ac) 2 | 11,000 | 3650 |
| Gregg Oil Co., T&P Ry. Fee 1-F | 10,000 | 3546 |
| Gulf Prod. Co., J. C. Judge (518-ac) 4 | 12,000 | 3519 |
| Humble O&R Co., I. D. Smith (100-ac) 6 | 8300 | 3624 |
| Kilgore-Barton & Henson, L. N. Colburn 1-B | 8500 | 3602 |
| W. W. Lechner & Hubbard, J. M. Tuttle (25-ac) 2 | 15,000 | 3554 |
| London Pet. Corp., T. J. Strudevant (Blk. 4) 1 | 9000 | 3621 |
| Lucey Pet. Co., Mahaney-Loeb 2 | 14,000 | 3578 |
| C. H. Lyons et al, J. B. Dobie 1 | 9600 | 3519 |
| J. H. Massie et al, M. Fenn (28-ac) 3 | 7500 | 3625 |
| Petroleum Pur. Corp. (was J. E. Harper), J. H. Sheppard (6-ac) 2 | 9500 | 3595 |
| Pilot Oil Co., J. C. Bumpas (25-ac) 1 | 11,000 | 3529 |
| Rancho Oil Co., H. Moyers (40-ac) 4 | 10,000 | 3643 |
| Red Star Oil Co., M. Lemaire (25-ac) 3 | 13,000 | 3619 |
| Sabinas Oil Corp., T. M. Collins (119-ac) 9-C | 9600 | 3692 |
| Selby O&G Co.- Lewis Prod. Co., L. C. Ingram (80-ac) 3 | 15,000 | 3551 |
| J. R. Snavely (321-ac) 3-B | 12,000 | 3569 |
| Shell Pet. Corp., R. L. Bassham (56-ac) 3 | 15,000 | 3648 |
| G. W. Richey (61-ac) 5 | 11,000 | 3638 |
| Shiloh Oil Co., Shiloh Church (3-ac) 1 | 10,000 | 3625 |
| Sinclair O&G Co., M. Moncrief (252-ac) 20 | 10,000 | 3570 |
| Smith & Mowinkle, Bauknight (70-ac) 4 | 9600 | 3611 |
| Stanolind O&G Co.-Simms Oil Co., J. H. Boles (30-ac) 2 | 14,000 | 3598 |
| Hobart Key (90-ac) 2 | 9000 | 3614 |
| J. C. Person (146.7-ac) 5 | 12,000 | 3574 |
| Sun Oil Co., J. C. Gray (114-ac) 3 | 6000 | 3625 |
| Superior Oil Co., A. Jones (64-ac) 5 | 15,000 | 3657 |
| Tidal Oil Co., J. J. Castleberry (202-ac) 5 | 4000 | 3571 |
| Boston Moore 2 | 3000 | 3565 |
| Yount-Lee Oil Co., L. E. Orms (55½-ac) 4 | 11,000 | 3526 |
| E. M. Whatley (51-ac) 2-A | 9500 | 3495 |
| VAN FIELD— | | |
| Pure Oil Co., W. F. Cade (45.3-ac) 1 | * | 3150 |
| Fletcher B. Smith (80-ac) 9 | 7500 | 2922 |
| The Texas Co., J. A. Bracken (44.48-ac) 3 | 9000 | 2931 |
| R. V. White (34.7-ac) 4 | 5312 | 2927 |

## WEST TEXAS

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| FISHER COUNTY— | | |
| Cranfill-Reynolds Co., L. J. Sipe 1 | 10 | 3140 |
| HOWARD COUNTY— | | |
| L. C. Harrison-The Texas Co., Denman 1 | 200 | 2807 |
| PECOS COUNTY— | | |
| Corvette Oil Corp., H. Monroe 8 | * | 651 |
| WARD COUNTY— | | |
| Alpine Oil & Dev. Co., J. F. Boogher 4 | 35 | 2215 |
| Stanolind O&G Co., M. Weiss 1 | 180 | 2410 |


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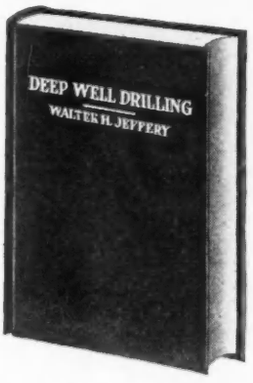


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## CALIFORNIA

FRUITVALE—Seahawk Pet. Co., No. 2A, 23-29-27; No. 2B, 23-29-27.

LOS ANGELES COUNTY—Albert Stevenson, No. 1, 21-4-14.

MIDWAY—Standard Oil Co., No. 105, 33-31-24.

ROUND MOUNTAIN—California Western Oil Co., No. 7, 7-28-29.

## LOUISIANA

SABINE PARISH—Bahan, L. F., Shreveport, Guacyhacgan 1, 11-7n-11w, 230 ft n and 330 ft w of se cor of sec. Frank Foster, Dallas, Texas, D. E. Stevens 1, 20-9n-11w, 237 ft s and 287 ft w of ne cor nw¼ nw¼.

TERREBONNE PARISH—The Texas Co., Shreveport, State Lake Barre 15, 37-21s-19e, 680 ft s and 1076 ft w of nw cor of sec 30-21s-20e being in Sec. 37-21s-19e.

## KANSAS

ELLSWORTH COUNTY—Robertson et al, Stratman 2, sw se ne 1-17-10w. Prairie O&G Stratman 1, sw ne sw, 1-17-10w.

McPHERSON COUNTY—Mid-Kansas O&G Bridgens 1, ne nw sw, 2-20-3w. Gypsy Oil et al, McGill 1, nw c se 7-20-1w. Derby Oil et al, Unruh 2, sw c se 26-19-2w. Derby Oil et al, Lacquement 2, nw c se 20-19-1w. Darby Pet. Coons 1, ne c sw 20-19-1w.

RICE COUNTY—Liggett et al, Thodel 1, c nw nw 11-21-7w.

## OKLAHOMA

COAL COUNTY—Rabial Oil, Miller 1, se c ne 10-2n-8e.

CREEK COUNTY—Gled Oil, Thomas 1, se c ne 8-19-9e. M. S. Hughes et al, Flinchum 2, se c sw sw 11-19-9e.

CUSTER COUNTY—Miley Pet., Caldwell 1, ne c 12-14-14w.

HUGHES COUNTY—Felenee et al, Whitley 1, nw se ne 14-7-8e.

MARSHALL COUNTY—M. A. Neff et al, Marshall 2, ne c sw nw se 30-5s-6e.

MUSKOGEE COUNTY—Armstrong et al, Morrison 9, (owd) c sw sw, 15-14-16e. J. V. Dunbar, Spaulding 2, sw c ne sw 4-15-18e.

OKLAHOMA COUNTY—Phillips Pet. et al, Everest 2, nw c se nw se 15-11-3w. Denver Prod. & Refg., Johnson 1, ne c sw nw ne 22-11-3w.

OKMULGEE COUNTY—F. E. Cusack et al, Doyle 5 (owd) ne c se sw 15-13-14e.

OKMULGEE COUNTY—O. K. Detrick et al, Bear 1, nw c ne se 29-16-13e.

OSAGE COUNTY—J. E. Cooper et al, 2, ne c sw se 26-21-10e.

POTTAWATOMIE COUNTY — Barnsdall Oil et al, Gray 1, ne c sw 25-6-4e.

SEMINOLE COUNTY—Barnes and Taylor, Bruner 1, sw se sw 29-10-6e.

STEPHENS COUNTY—Pace et al, Green 2, se c sw ne 2-2s-8w.

WAGONER COUNTY—J. E. Martin et al, Drew 1, sw c ne 26-18-15e.

## TEXAS

ARCHER COUNTY — Perkins & Cullum, Wichita Falls, Ealls, D, 83, 3, B 3, Falls C. S. L. sur, 150 ft from s and w lines. Deep Oil Dev. Co., Wichita Falls, L. W. McCrory, 80, 3, B 119, Amer. Trib. sur, 990 ft from n and 330 ft from w line. Bridwell Oil Co., Wichita Falls, Oil Inv. Co., 498, 22, B 125, Club Ranch sur, 1255 ft from w and 800 ft from n line.

BRISCOE COUNTY—Humble Oil & Refg. Co., Wichita Falls, C. Adair, 1, S 7, B GG, A&G sur, 2100 ft from n and 3500 ft from e line sec.

BORDEN COUNTY—Gwinnup & Dulaney, Fort Worth, S. I. Munger, 640, 1, S 15, B 31, T&P sur, 1980 ft from n and e lines of sec.

***For Tabulation and Comparison See Market Section***

BEXAR COUNTY—Chiquita Oil Co., San Antonio, D. Kosub, 175, 1, J. W. Riall sur, 220 ft from w and 566 ft from s line.

BRAZORIA COUNTY — Texas Co., Houston, Wm. Cave, 148, 2, A. Darst sur, 165 ft from sw and 55 ft from se line.

CARSON COUNTY—Skelly Oil Co., Tulsa, Okla., H. Schafer, 960, 27, S 88, B 4, I&GN sur, 440 ft from w and 1265 ft from s line.

DENTON COUNTY—Freeman & Freeman Oil Co., Denton, F. Freeman, 900, 1, MEP&P sur, ne corner.

DUVAL COUNTY—Duval Oil Corp., San Antonio, Bishop, 320, 8, S 135, 990 ft from n and 1980 ft from w line sec.

EASTLAND COUNTY — Edwards & Wilkins, Eastland, City, 50, 1, S 6, B 6, E. T. Ry. sur, 150 ft from n and e lines. W. H. Lobaugh, Eastland, H. C. Daken, 167, 1, S 22, B 4, H&TC sur, 320 ft from s and e lines.

ELLIS COUNTY — Miracle Drilling Co., Dallas, J. J. Trojacek, 2½, 1, R. Pena sur, 155 ft from s and w lines.

FALLS COUNTY—E. W. Bateman, Fort Worth, J. Czajkowski, 70, 2, R. Moffitt sur, 150 ft from s and e lines.

GREGG COUNTY—Welch & Sandler, Kansas City, Mo., R. W. Barnett, 100, 2, T. Johnson sur, 330 ft from s and e lines. Golding-Murchison Oil Co., Dallas, L. P. Griffin, 82, 5, M. Van Winkle sur, 330 ft from w and 708 ft from s line. Frank Russell, Birmingham, Ala., F. Stone, 50, 1, B. Anderson sur, 660 ft from n and e lines. R. J. St. Germain, Tyler, L. Martin, 22, 2, T. Johnson sur, 330 ft from w and 343 ft from s line. Jones-Doss Oil Co., Longview, E. Hagler, 30, 4, J. S. Caruthers sur, 117 ft from n and 650 ft from w line. Skipper-Bivins Oil Co., Inc., Longview, M. Magrill, 12, 2, D. Sanchez sur, 230 ft from e and 150 ft from s line. O. W. R. Oil Co., Dallas, C. E. Davis, 4, H. Hathaway sur, 931 ft from w and 277 ft from s line. W. H. Crowder, Longview, Pythian Lodge, ½, 1, M. Van Winkle sur, 100 ft from n and 80 ft from w line. Shell Pet. Corp., Dallas, O. Lockett, 25, 1, D. Ferguson sur, 282 ft from w and 330 ft from s line. G. W. Richey, 114, 8, L. J. Rigsby sur, 330 ft from s and e lines. Stanolind Oil & Gas Co., Longview, Wm. Clayton, 50, 2, L. B. Outlaw sur, 990 ft from w and 352 ft from s line. Atlantic Oil Prod. Co., Dallas, E. Burnside, 204, A6, F. W. Johnson sur, 330 ft from w and 990 ft from s line. Yount-Lee Oil Co., Beaumont, M. M. Custer, 75, 3, I. Skillern sur, 330 ft from s and w lines. V. Calvin, 62, 3, H. Hathaway sur, 330 ft from n and e lines. Gulf Prod. Co., Houston, J. C. Judge, 518, 6, F. W. Johnson sur, 660 ft e of No. 5. A. Neeley, 49, 4, C. H. Alexander sur, 306 ft from e and 247 ft from s line. E. L. Walker, 49, 1, Jno. Tate sur, 339 ft from e and 330 ft from n line. Arkansas Fuel Oil Co., Shreveport, La., J. C. McKinley, A, 96, 3, Wm. Robinson sur, 330 ft from n and w lines. Sun Oil Co., Dallas, G. Reese, 124, 1, J. Hoy sur, 330 ft from w and 1051 ft from s line. E. C. Shoults, 100, 3, D. Ferguson sur, 330 ft from e and 409 ft from s line. Magnolia Pet. Co., Dallas, M. Dyer, 40, 4, H. Hathaway sur, 330 ft from n and e lines. J. Radford, 252, 4, T. Johnson sur, 337 ft from w and 330 ft from s line. Simms Oil Co., Dallas, J. J. Flewellen, 200, 3, M. Mann sur, ne corner.

JACK COUNTY—R. J. Brown, Henrietta, L. J. Webb, 40, 1, B 4, E. Smith sur, 150 ft from n and 450 ft from w line.

McLENNAN COUNTY—Bacon, Douglas & Blanton, Waco, F. H. Miller, 200, 1, J. D. Sanchez sur, 240 ft from n and w lines.

NUECES COUNTY—Camp & Stanolind Oil & Gas Co., Fort Worth, R. King, 4000, 1, S 23, 660 ft from n and w lines of sec.

PALO PINTO COUNTY — Prairie Oil & Gas, Ranger, S. Ritchie, 640, 1, S. P. Ry. No. 1 sur, 350 ft from n and w lines.

PECOS COUNTY—Black et al, Grandfalls, Pecos Valley, 80, 1, S 36, B 3, H&TC sur, 433 ft from w and 1037 ft from s line sec.

RUSK COUNTY—Falcon Co., Fort Worth, T. O. Mason, 148, 8, J. B. Cadena sur, 330 ft from n and e lines. Devonian Oil Co., Overton, R. A. Motley, 442, 12, Wm. Killen sur, 800 ft sw of No. 6; 13, 800 ft ne of No. 11. F. B. Jackson, Jr., Wichita Falls, M. D. Williamson, 116, 1, W. R. Cooke sur, 330 ft from s and e lines. H. H. Hunt, Columbus, J. C. Gibson, 2, 1, T. C. Lloyd sur, 194 ft from e and 130 ft from s line. Shell Pet. Corp., Dallas, W. P. Moore, 140, 9, H. Wiggins sur, 330 ft from e and 1020 ft from s line. Texas Co., Shreveport, La., J. M. Price, 90, 2, T. M. White sur, 721 ft from e and 330 ft from s line. Gulf Prod. Co., Houston, A. H. Rayford, 59, 1, F. Cordova sur, 301 ft from s and 330 ft from e line. W. O. Alford, 157, 1, M. Hussner sur, 792 ft from s and 330 ft from e line. S. Stone, 28, 3, M. J. Pru sur, 330 ft from n and w lines. Humble Oil & Refg. Co., Houston, W. D. Peterson, 100, 1, J. Lewis sur, 503 ft from n and 330 ft from w line. R. E. L. Silvey, B, 209, 2, T. J. Martin sur, 575 ft from n and 330 ft from e line. Mid-Kansas Oil & Gas Co., Shreveport, La., J. Lunsford, 71, 1, J. P. Cadena sur, 330 ft from w and 460 ft from s line. R. M. Weaver, 40, 1, W. J. Roan sur, 330 ft from n and 413 ft from e line.

SMITH COUNTY—Sun Oil Co., Dallas, J. D. Hussner, 216, 8, H. J. Vargas sur, 330 ft from w and 2304 ft from s line. Arcadia Refg. Co., Tyler, J. R. Green, 10, 1B, Jas. Jordan sur, 662 ft from n and 111 ft from e line.

STARR COUNTY—M. A. Landrum, Harlingen, Kelsey Bass, 30, 2, S 6, Los Olmos sur, 369 ft n of No. 1.

SHACKELFORD COUNTY — Freeman-Hampton Oil Corp., Wichita Falls, Buie-Morris, 160, 1, S 204, E. T. Ry. sur, 220 ft from n and e lines.

UPSHUR COUNTY — H. W. Clarkson, Tyler, J. O'Byrne, 46, 2, S. Harrell sur, 330 ft from s and e lines. Sun Oil Co., Dallas, T. C. Ramey, 90, 3, Wm. King sur, 200 ft from w and 600 ft from s line.

VAN ZANDT COUNTY — Humble Oil & Ref. Co., Houston, A. J. Fowler, 95, 5, Wm. Daniel sur, 220 ft from e and 1735 ft from s line.

WARD COUNTY—A. Bradford et al, Grandfalls, B. Carson, 40, 1, S 26, B 5, H&TC sur, 330 ft from s and w lines; M. L. Johnson, 40, 1, S 10, B 32, H&TC sur, 330 from n and 240 ft from w line. S. J. Rixford et al, Grandfalls, K. S. Green, 40, 1, S 4, B 34, H&TC sur, 300 ft from n and w lines. Plains Prod. Co., Dallas, Benton, 640, 1, S 26, B 1, W&NW sur, 440 ft from s and w lines of sec. Bradford & Bentley, Grandfalls, E. Beatty, 80, 1, S 3, B 34, H&TC sur, 330 ft from n and w lines. Gulf Prod. Co., Houston, Hutchings, 10, S 5, B F, G&MMB&A sur, 330 ft from n and w lines; G. W. O'Brien, 21, S 16, B F, G&MMB&A sur, 2557 ft from n and 330 ft from e line. Richardson & Kelsey, Fort Worth, O'Brien-Edwards, 100, 7, S 5, B F, G&MMB&A sur, 330 ft from s and w lines.

WEBB COUNTY—W. R. Shanklin, Laredo, Ellison, 80, 1, S 466, B 2, 150 ft from n and w lines.

WICHITA COUNTY—T. F. Hunter, Wichita Falls, Waggoner, H, 80, 2, S 2, B 7, GC&SF sur, 424 ft from w and 1327 ft from s line. Reno Oil Co., Wichita Falls, J. E. Roller, 80, 6, S. Holloway sur, ne cor of Blk. 4.

YOUNG COUNTY—Christie Bros., Wichita Falls, J. H. McLaren, D, 50, 1, Jno. Conner sur, 200 ft from n and e lines. O. M. Wallace, Wichita Falls, J. L. Anderson, 132, 1, 1913 TE-&L sur, 150 ft from w and 1550 ft from s line. Kleiner & Riggs, Graham, J. F. Larimore, B,

(Continued on page 67)

# Wildcat Reports from All Sections

▼ ▼ ▼

## SOUTHERN CALIFORNIA

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| EL NIDO— | | |
| Mohawk Pet. Co.'s Pavey 1, 29-3-14 | * | 6262 |

CALABASAS—L. W. Rucker's No. 1, 26-1-17, sd 750 ft.

HERMOSA BEACH — Corniel Oil Corp.'s No. 1, sd 3100 ft. Westwood Oil Producers' No. 2, co 2146 ft.

LYNWOOD—W. L. Jones' Graham 1, 31-2-12, sr 1060 ft.

NEWPORT BEACH—Ajax Pet. Co.'s B. G. 1, 16-16-10, dr hard gray sand 8135 ft, may not drill below 7500 ft. Orange County Refining Co.'s No. 5, 9-6-10, sd 1825 ft, plugged to 1360 ft, showed water.

OLINDA—Graham-Loftus Oil Co.'s No. 1, plugged to 4100 ft for test of upper zone, td 9284 ft.

OCEAN PARK—Hines Pet. Corp.'s Happy Days 1, 8-2-15, sd 7405 ft.

PLAYA DEL REY — Cooperative Development Co.'s No. 1, 26-2-15, rig.

WILMINGTON—Ranger Pet. Corp.'s Watson 2, 21-4-13, co 3784 ft, will lower tubing to increase production; pumped at 50-bbl rate on production test. Stevenson Brothers' No. 1, 21-4-14, new lcn.

## NORTHERN CALIFORNIA

### KERN COUNTY

BUTTONWILLOW—Graham-Loftus Oil Co.'s Carmel 1, 20-27-22, dr shale 6215 ft. General Pet.'s Morris 1, trying to flow well with gas, td 2615 ft. Milham Exploration Co.'s Kern 2, 8-28-23, sd 2702 ft; Kern 10, 5-28-23, dr shale 2525 ft, 9-in cas cmt 2475 ft. Whitaker 1, 8-28-23, lcn.

DEVIL'S DEN—Cumberland Oil Co.'s Cumberland 2, 17-26-18, fsh for slips 3226 ft. Totem Oil Co.'s Taylor 1, 29-25-19, rigging rotary.

EL TEJON—Descanso Oil Co.'s Tejon 1, 31-11-19, dr shale 1414 ft.

McKITTRICK—T. H. Purman's No. 1, 22-29-21, dr shale 3175 ft. Welport Oil Co.'s No. 8, 26-29-21, dr shale 1115 ft.

SEMITROPICAL —Fullerton Oil Co.'s Core Hole C, 25-27-23, dr shale 2615 ft.

WEED PATCH—Osborn-Colter's Duff 2, 15-30-29, pumping 15 bbls 15 gravity oil, td 2006 ft.

WHEELER RIDGE—Barnsdall's K.C.L. 1, 15-11-20, dr shell 3688 ft.

### SANTA BARBARA COUNTY

CARPENTERIA—Texas' McDougal 1, 34-4-25, lcn.

GOLETA—General Pet.'s Hollister 1, 10-4-29, dr shale 715 ft; More 3, 22-4-28, flowing gas above plug at 4375 ft, will shut in, td 6912 ft. Strickland and Tippet's Duncan 1, 19-4-27, sd 4691 ft.

LOS ALAMOS—Barnsdall's Careaga 1, 31-8-33, dr shale 2300 ft.

SANTA MARIA—O. C. Field Gasoline Co.'s Norswing 1, 8-9-33, plugged to 5200 ft, td 5568 ft. Western Gulf's Bradley 1, 5-9-33, fsh 8566 ft.

SANTA ROSA ISLAND—Standard's No. 1, bldg roads, lcn not announced.

### VENTURA COUNTY

CONEJO—American Oil Co.'s Powell 1, 33-2-20, dr hard sand 1575 ft. Sycamore Oil Co.'s Hansen 1, 24-1-20, dr hard sand 1000 ft. Triunfo Oil Co.'s No. 1, 24-1-19, co 2080 ft, will deepen.

HOPPER CANYON—Bardeen Pet. Co.'s Lamkershim 2B, 13-4-19, rigging rotary.

OJAI—A. N. Macrate's Cosmon 1, 27-4-23, lcn.

PIRU—Torrey-Ventura Oil Co.'s No. 1, 32-4-18, dr out cmt, td 930 ft.

RINCON—Woodruff Oil Co.'s Lomas 1, 4-3-24, lcn.

SANTA PAULA — San Pedro-Pt. Fermin's Kellerman 1, 13-4-21, pumping 120 bbls 34.7 gravity oil, td 3845 ft.

SOUTH MOUNTAIN—H. H. Bell's Lemon 1, 22-3-21, dr 2285 ft.

### ABBREVIATIONS

NOTE—The following is the explanation of abbreviations, signs, etc., used in completion and wildcat reports: *—dry hole, abandoned well; ‡—salt water; †—junked and abandoned; ¶—million feet of gas; abn — abandoned; bbls—barrels; b.s.—basic sediment; cas—casing; co—cleaning out; dk—derrick; dr—drilling; fsh—fishing; ft—feet; in.—inches; lcn—location; m—milling; n, s, e, w—north, south, east, west; r—reaming; sd — shut down; sdtr — sidetracking; sp — spudding; sr—straight-reaming; std — standardizing; sw — salt water; td—total depth; ur—underreaming; wo—workover; wosr—waiting on standard rig.

### MISCELLANEOUS

KINGS COUNTY—Knudsen and Schmidt's Avenal 1,. 36-23-17, sd 5716 ft. Eagle Oil and Gas Co.'s No. 1, 15-23-20, bldg rig, td 1125 ft. E. B. Guess' No. 2, 12-23-22, dr shale 2215 ft, may abn. Irma Investment Co.'s Watson 2, 7-23-20, dr 1225 ft, to make test. Tulare Basin Gas Co.'s Goodfellow 1, 2-23-19, dr shale 1130 ft. Valley Exploration Co.'s Dudley 1, 12-23-19, dr out cmt, td 1302 ft.

MONTEREY COUNTY—Pacific Inland Oil Co.'s No. 1A, 19-23-15, sd 2340 ft.

NAPA COUNTY—Napa Oil Co.'s Griffith 6, 7-8-3, 8⅝-in cas cmt 2850 ft.

SAN JOAQUIN COUNTY—Union's Tracy 1, dr hard sand 4900 ft.

SAN LUIS OBISPO COUNTY—Kent and McDonald's No. 1, 3-32-22, sd 2462 ft. Emerich Oil Co.'s No. 1, 13-28-12, dr shale 1785 ft.

TULARE COUNTY — Gravity Exploration Co.'s Hudson-Buck 1, 11-24-23, rig. Tulaco Oil Co.'s No. 1, 17-22-22, rig.

YOLO COUNTY—Pacific Northern Oil and Gas Co.'s Guinda 1, 23-12-3, will co to 2007 ft and deepen.

## OKLAHOMA

ALFALFA COUNTY—T 27n, R 11w, Sec. 12, Smith Bros.' Forbes 1, ne c se nw nw, sd 1420 ft.

KAY COUNTY—T 27n, R 2e, Sec. 9, Mummer et al's Sornick 1, nw c se, sd 3693 ft.

GRANT COUNTY—T 25n, R 4w, Sec. 22, Cowden's Vollmer 2, ne ce se ne sw, sd 5640 ft.

ALFALFA COUNTY—T 24n, R 11w, Sec. 14, J. V. Bailey's Acre 1, c sw ne, sd 5502 ft.

GARFIELD COUNTY—T 24n, R 6w, Sec. 9, Pulse & Beamer's White 1, se c nw, sd 5850 ft.

BLAINE COUNTY—T 19n, R 10w, Sec. 13, Washoma's Phillips 1, c nw sw, sd 5120 ft.

LOGAN COUNTY—T 18n, R 3w, Sec. 33, Healey et al's Quier 1, se c sw, sd 3970 ft.

KAY COUNTY—T 28n, R 3e, Sec. 24, Atkinson et al's Hays 1, se c ne, dr 2750 ft.

PAWNEE COUNTY—T 20n, R 5e, Sec. 6, W. A. Rookstool's Berry 1, nw c ne sw, td 1951 ft.

LINCOLN COUNTY—T 17n, R 5e, Sec. 36, Mote et al's School land 1, nw c, sd 1160 ft. T 14n, R 3e, Sec. 2, Hilton Phillips et al's Phillips 1, sw c nw, dr 2010 ft.

CREEK COUNTY—T 14n, R 7e, Sec. 18, Cal Cul's Holleyman 1, se ne se, fsg 705 ft.

LINCOLN COUNTY—T 13n, R 6e, Sec. 8, Atlantic's Beebee 1, ne sw sw, dr 3270 ft.

PITTSBURG COUNTY—T 7n, R 14e, Sec. 34, Tape Oil Co.'s Fulsom 1, se c, dr 1455 ft.

LATIMER COUNTY—T 6n, R 19e, Sec. 16, P. English's Weaver 1, c nw se, sd 1542 ft.

PITTSBURG COUNTY—T 5n, R 14e, Sec. 9, W. B. Bailey's Coal land 1, ne c sw, dr 1050 ft.

OKLAHOMA COUNTY—T 12n, R 4w, Sec. 17, C. F. Cuniff's St. Joseph 1, sw c ne sw se, td 6700 ft d&a.

SEMINOLE COUNTY—T 10n, R 6e, Sec. 19, Bunte et al's Bruner 1, se c nw, rig.

POTTAWATOMIE COUNTY—T 6n, R 4e, Sec. 2, Mid-Continent's Farmer 1, se c sw nw, sand 4418-31 3500 ft wtr; d&a.

ROGER MILLS COUNTY—T 12n, R 24w, Sec. 23, Ute Oil's Williams 1, c sw, sd 5150 ft. T 11n, R 26w, Sec. 4, J. J. Rook and Palmer's Davis 1, c nw ne (owd) dr 3420 ft.

CANADIAN COUNTY—T 10n, R 6w, Sec. 1, J. V. Bailey's Robinson 1, c ne nw, sd 150 ft.

WASHITA COUNTY—T 9n, R 17w, Sec. 23, Miley Pet. Corp's Chapman 1, ne c sw, rig. T 8n, R 19w, Sec. 29, Cooper & Terhune's Blocker 1, nw c, sd 2757 ft. T 8n, R 18w, Sec. 21, Burns & Prince's Dock 1, sw c sd, 1265 ft.

GREER COUNTY—T 7n, R 21w, Sec. 23, French et al's Murphy 1, sw c nw se, sd 1654 ft.

CADDO COUNTY — T 5n, R 9w, Sec. 6, Mid-Kansas & Ramsey's Culp 6, nw c ne, td 10,079, small sho oil and gas; pb 6780 ft shot 80 qts 6750-80 ft no sho; pb 6094 ft, ripped pipe at 6077-89 ft; sho ¶10 and 20 bbls salt water, sd.

COMANCHE COUNTY—T 4n, R 12w, Sec. 33, Snodgrass et al's Willetts 1, ne c nw, sd 515 ft.

GARVIN COUNTY—T 2n, R 2w, Sec. 24, Malernee's Phillips 1, ne c sw, sd 4800 ft.

COAL COUNTY—T 1s, r 8e, Sec. 2, Rabial Oil Co.'s Richardson 1, ne c nw, sd 1450 ft.

ATOKA COUNTY—T 3s, R 10e, Sec. 18, Brookshire et al's Quinn 1, nw c, sd 1720 ft.

## KANSAS

SUMNER COUNTY—Trees Oil Co. & Shell, Springate 1, ne se sw, 6-34-2e, dr by 10-inch, td 2285 ft.

KINGMAN COUNTY — Panhandle Drlg. Co., Wetherall 1, c se nw sw, 20-28-10w, sd 890 ft.

HARVEY COUNTY—Liggett et al, Davis 1, c sw se ne, 7-24-1e, sd 2500 ft.

GREENWOOD COUNTY—Ward McGinnis, Burk 1, sw ne, 10-24-8e, dr 2015 ft.

FINNEY COUNTY — National Ref. Co., Wells 1, sw c, 12-23-30w, dr 3900 ft.

RENO COUNTY—Jarvis & Wright, Rainbow 1, nw nw se, 33-22-7w, rig.

RICE COUNTY—Joe Liggett et al, Thodel 1, c nw nw 11-21-7w, spd and sd.

McPHERSON COUNTY—Twin Drlg. Co., et al, Farver 1, sw se, 16-20-1w, hfw 3008- ft, td 3180 ft.

BARTON COUNTY—Skelton Oil, Ott 1, c se se, 16-19-14w, sd 3375 ft, csg trble, rng 6-inch.

RICE COUNTY—Gypsy, Steckle 1, c ne nw, 31-19-10w, show oil and water 3090-3100 ft, so 3124-28 ft, 6-inch 3252 ft.

RUSH COUNTY—Shelton-Schleagel, Brock-Hartman 1, sw se nw, 4-18-12w, spd and sd.

MORRIS COUNTY—Urschell et al, Bersuch 1, c nw se nw, 10-17-7e, sd 915 ft.

ELLSWORTH COUNTY—Raymond Gear et al, Sauberli 1, c sw se, 29-16-9w, spd and sd.

MORRIS COUNTY—Kastle et al, Furney 1, ne se, 16-16-8e, spd and sd. Hankenson et al, Cessnum 1, sw se 24-17-9e, sd 2625 ft.

RUSSELL COUNTY—Tom Palmer et al, Pasek 1, c se, 3-14-11w, T. congl. 3260 ft, td 3310, co.

OSAGE COUNTY—Riggs-Smith, Wood 1, c se nw, 31-14-15e, td 2200 ft.

RUSSELL COUNTY—James Brennan, Walz 1, cwl e½ nw 29-13-11w, ru. Twin Mounds Oil, Weis 1, c w½ ne nw, 30-13-4w (owd), td 210 ft, sd.

DICKINSON COUNTY—Severs et al, Livingood 1, ne sw, 13-13-2e, sd 4752 ft.

SHERIDAN COUNTY — Flo et al, Shoemaker 1, se sw sw, 27-27-26w, td 4135 ft, fsh 6-inch.

WASHINGTON COUNTY—Simcox, Penwell 1, nw se nw, 16-3-3e, sd 1720 ft.

RAWLINS COUNTY—Danciger et al, Unknown 1, sw c, 3-2-35w, 6-inch 3875 ft, hfw 3925 ft, sd.

## ARKANSAS

CLAY COUNTY—S. C. Jeffus, Tr.'s Underwood 1, 4-20-8e, sd 1260 ft.

CLEBURNE COUNTY—Frank S. Craver's Donithan Lbr. Co. 1, 33-11-9, sd 3470 ft.

CLEVELAND COUNTY — Crum & Stillwell's Bell 1, 10-10s-12w, rigged up and sd.

COLUMBIA COUNTY—Kendall Oil Co.'s Fullenwider & Kitchen 1, ne ne 13-17-22, sd 814 ft.

DALLAS COUNTY—Zepp O&G Co.'s Hillman 3, nw ne 20-10-13, lcn. Jno. James, Tr.'s Fordyce Lbr. Co. 1, 11-9s-15w, sd 2520 ft.

DREW COUNTY—Cooperative Dev. Co.'s Ogles 1, ne nw 35-15-5, sd 1890 ft.

HOT SPRINGS COUNTY—Starr Oil Co.'s Cunningham 1, 11-5-16, 12½ cas 62 ft, sd 1262 ft shale and bldrs.

LINCOLN COUNTY — L. B. Cook, Tr.'s McGehee Pltg. Co. 1, 5-8s-7w, sd 2985 ft.

LITTLE RIVER COUNTY—Fay Roberts Oil Co.'s Russell 1, 25-12-29, lcn.

LOGAN COUNTY—M. W. Greesom's Parks 1, 21-8-24, sd 1309 ft. J. H. Flowers' White 1, 13-5-26, sd 3610 ft.

MILLER COUNTY — W. E. Noel et al's Dickson 1, 11-20-27, sd 1955 ft. Fitzwater et al's E. L. Beck 1, sw se 33-15-26, sd 2220 ft.

OUACHITA COUNTY—W. H. Copenhaver et al's Berg 1, se se 13-15-17, 10-in 42 ft sd 2011 ft.

PIKE COUNTY—Kentucky-Ark. O&G Co. Inc.'s Tilyou 1, 26-8-24, ta 2920 ft. East 1, 13-9-23, 10-in 288 ft sd 1812 ft hd rock.

PRAIRIE COUNTY — Powell Creek O&G Co.'s Kloss 1, ne nw 3-4n-6w, partly rigged up and sd.

SCOTT COUNTY — Heavener O&G Co.'s Reser 1, 36-4-26, sd 1436 ft. Waldron O&G Co.'s J. G. White 1, 17-3n-29w, sd 1860 ft (sec. hole).

SEBASTIAN COUNTY—M. W. Greesom's Spears 1, 9-7-29w, sd 1536 ft.

SEVIER COUNTY — Tri-State O&G Co.'s Bank of DeQueen 1, 34-8s-32w, sd 950 ft.

ST. FRANCIS COUNTY—Walmer Oil Co.'s White 1, sw nw 1-4n-2e, rig.

UNION COUNTY — Southern Prod. Co.'s Wingfield 1, 16-19-15, repr rig and arr res, td 2608 ft. Lion O. R. Co et al's Guy P. Hayes A-9, ne ne 4-16-15, elev. 96 ft sd again, with hung ds acct high water, td 7255 ft salt. Drillers Oil & Dev. Co.'s Pickering 1, 1-17-16, wosr 2134 ft. Modisette et al's Union Sawmill 1, sw nw 13-18-13, 10-in 167 ft top sand 2266 ft tested sw slight oil show, 2266-80 ft sd 2280 ft. Hill et al's Barnes 1, ne ne 21-19-15, dk.

WASHINGTON COUNTY — C. H. Willoughby's Jones 1, 34-16-30, sd 2150 ft.

YELL COUNTY—T. Luckett's Balcon 1, 36-7-12, ta 5640 ft.

## NORTH LOUISIANA

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| SABINE PARISH— | | |
| C. H. Tuttle, Byrd 1, 7-7-10..... | * | 2718 |

BOSSIER PARISH—H. I. Morgan et al's Strange 1, ne sw sw 23-19-11, 10-in 123 ft 6-in 1721 ft cor oolitic lime, 1770 ft. Plain Dealing O&G Co.'s Nattin 1, 15-22-14, 4½ cas 2882 ft 150 oil in hole, wosr 2890 ft. Dr. Hankins et al's Newell 1, 12-19-11, dr 1985 ft. Triangle Drilling Co.'s Nuckolls 1, sw ne 7-22-12, rig.

CADDO PARISH—Pelican Nat. Gas Co.'s Cooper 1, 29-18-14, ta 3648 ft red shale and lime. Louanna O&G Co.'s Inc's Hammock 1, se se 32-19-16, elev. 258 ft top bro chalk 1350 ft base chalk 1735 ft dr 1825 ft. Calatex O&G Co.'s Hudson 1, 8-16-16, 10-in 80 ft dr 1565 ft.

CALDWELL PARISH—Monroe Pet. Corp.'s Button 1, 36-12-2e, sd acct titles, 2986 ft. Carter Bell et al's Taylor 1, 17-14-4e, 12½ cas 110 ft sd 1100 ft high water.

DESOTO PARISH—A. R. Smith's Horn 1, nw se 15-12-16, sp and sd. Rellit O&G Co.'s Cannon Hrs. 1, 12-11-16 sd 1965 ft. E. T. Oakes' Johnson 1, 30-13-15, coring 3218 ft lime and shale. Walters and Nicholson's Jim Guy 1, 3-11-13, sd 1260 ft. DeSoto Dev. Co.'s Nickie 1, sw se 7-13-12, dk.

NATCHITOCHES PARISH—C. M. Talley et al's Talley 1, 29-11-10, sd 1380 ft. J. W. Cooper et al's Cooper 2-A, 35-11-10, sd 1515 ft. Gerson et al's Smith Island 1, sw nw sw 11-10-8w, 12½ cas 90 ft gas and sw flow killed, arr skid over for new hole, td 585 ft sand. R. A. Keator's Stephens 1, 25-10-6w, 12½ cas 178 ft sd.

OUACHITA COUNTY—S. C. Wilson's W. L. Williams 1, sw se 5-16-1e, 12½ cas 180 ft dr 2604 ft chalk.

RICHLAND PARISH—National Gas Co.'s Singletary 1, 20-18-7e, sd 2515 ft.

SABINE PARISH—J. J. Kean's Belton 1, nw se ne 31-9-13, 8-in cas 1590 ft at top chalk base chalk 2115 ft dr 2850 ft. R. L. Gay, Tr.'s Long-Bell A-1, nw nw 10-8-13, elev 265.4 ft top Glen Rose 4204 ft 6-ft core oolitic lime had saturation light oil, fsh ds hung at 1228 ft while sr, td 4789 oolitic lime (Glen Rose). Coats Pet. Co.'s Stille 1, nw se 35-8-13, lcn. Hill 1, se se 35-8-13, lcn. S. Martinez 1, se ne 3-7-13, lcn. F. Martinez 1, ne nw 11-7-13, 6-in 2036 ft dr 2360 ft. F. Martinez 2, 11-7-13, dk. G. Martinez 1, sw sw 2-7-13, dk. Patterson 1, sw sw 2-7-13, 10-in 100 ft cemt 6-in 2050 ft td 2057 ft. Mansfield Hdw 1, sw se se 36-8-13, 10-in 100 ft 6-in 2070 ft completed flowing est 500 bbls oil day by heads, flowed several hours bridged, td 2403 ft chalk. Hudson & Bird's Walden 1, sw ne 26-8-11, elev 290 ft 10-in 100 ft top marl 2355 ft, top bro chalk 2440 ft, sd 2454 ft chalk. Zeke Lohman's McCormick 1, ne sw 2-7-11, dr 2150 ft. Loring Oil Co.'s Bowman-Hicks 18, sw nw 15-7-12, elec 264.1 ft 15½ cas 100 ft 9¾ cas 3950 ft top marl 2482 ft top chalk 2537 ft top lower Cretaceous 3998 ft ds and rock bit in hole whipped stock at 4390 ft td 4500 ft. Root Ref. Co.'s Peterson 1, sw ne 34-7-13, 10-in 40 ft arr res td 2243 ft. G. M. LeGrand's McGough 1, 3-8-10, dk. W. F. Lacey's McNeely 2, ne ne 14-7-11, 10-in 100 ft 6-in 2451 ft, dry 2470 ft, dry 2558 ft, sd 2558 ft. Beene et al's Ezernack 1, sw ne ne 2-7-13, dr 1600 ft. Farrell et al's Haley 1, 6-7-12, rig. C. H. Tuttle's Byrd 1, nw nw 7-7-10, 10-in 102 ft 6-in 2442 ft dry abn td 2718 ft. Service Royalty Co.'s Gardner B-1, sw nw 7-7-10, 10-in 102 ft 6-in 2450 ft dry at 2812 ft arr abn. Baird & Stone's McNeely 1, 14-7-11, 10-in 100 ft cemtd 6-in 2375 ft. J. E. Smitherman's Smith 1, sw nw 7-7-10, 10-in 100 ft 6-in 2518 ft, dry 2595 ft arr test 2800 ft. Ohio Oil Co.'s Bowman-Hicks 14, nw sw 3-7-12, 10-in 129 ft 6-in 2326 ft dry 2617 ft dr 2660 ft chalk. Frank Foster, Inc.'s Stevens 1, ne nw nw 20-9-11, 10-in 100 ft dr 2200 ft. W. H. Coats' McNeely 2, nw ne 14-7-11, dk. Stovall Drilling Co.'s Nulton 3, se ne 2-7-13, lcn. Biard & Hunter's Petty 1, nw se 11-7-11, rig. H. W. Perritt's Brown 1, sw se 6-7-10, sp 10-in 103 ft dr 200 ft. Texas Co.'s Giaque B-1, ne se 10-7-13, sp 10-in 54 ft dr 1200 ft. Bahan & Morgan's Quahagen 1, se se 11-7-11, rig. Sabine Prod. Co.'s Pearce 3, se nw 10-7-11, dk.

TENSAS PARISH—A. R. Willis' Curry 1, 39-11-12e, sd 3545 ft. Stovall Drilling Co.'s Miller 1, ne sw 10-10-10e, lcn.

## MISSISSIPPI

CHICKASAW COUNTY—Hightower & Golson's Fleming 1, 20-13-3e, ta 1640 ft.

HINDS COUNTY (Edwards Dist.)—Miss.-Minn. Oil Co.'s Edwards Land Co. 1, sw ne 23-6n-4w, rig.

JASPER COUNTY (Bay Springs Dist.)—Bay Springs Pet., Inc.'s, J. H. Keyes 1, nw ne 21-2n-10e, dr 3245 ft, Wilcox.

LAMAR COUNTY (Purvis Dist.)—Stauffer & Kouri, Tr.'s, Bond 1, se ne 18-2n-14w, move in rig.

LOWNDES COUNTY — Lowndes County O&G Co.'s Carr Est. 1, ne nw 34-17n-16e, rig.

MONROE COUNTY( Amory Dist.)—Amory Dev. Co.'s Bourland 1, 2-15-19, ta 3007 ft, brown sand. P. J. McAlpine's Cowart 1, 2-12s-19w, ta 3793 ft, brown sandy lime.

NEWTON COUNTY (Newton Dist.)—Dalton Dev. Co.'s Majure 1, se se 25-6n-11e, 10-inch 295 ft, sd 1420 ft.

NOXUBEE COUNTY — Thompson O&G Synd.'s Donahue 1, se 25-16n-17e, elev 280 ft, sd wo 1735 ft; Ames 1, nw nw 24-16-18e, dk pat.

RANKIN COUNTY (Jackson Dist.)—Atkisson & Dyer's Valentour 1, nw nw 18-5-2e, elev 270 ft, sd wo cas 2428 ft. Majestic O&G Co.'s Elton Lbr. Co. 1, 10-4n-3e, dk.

SCOTT COUNTY—Culley et al's Owen 1, 2-8n-9e, dk.

SHARKEY COUNTY (Nita Yuma Dist.)—United Gas Pub. Serv. Co.'s Lenhart 1, sw se 14-14n-6w, elev 100.6 ft, 15½ cas 245 ft.

WARREN COUNTY (Vicksburg Dist.)—Eagle Lake O&G Co.'s Kiger 1, sw ne 9-18-2e, sd 2607 ft.

WEBSTER COUNTY — P. J. McAlpine's Henley 1, se nw 15-21-11e, cored gravel, sd 1800 ft.

## ALABAMA

MADISON COUNTY — Tennessee Valley O&G Co.'s Fee 4, 1-4s-2e, no report.

SUMTER COUNPY (Livingston Dist.)—Forked Lightning O&G Co.'s Nixon 1, 30-20-2w, dk.

WASHINGTON COUNTY—Hobson et al's Hobson Bros. 1, 9-8-2w, ta 1450 ft. Oscar Brown's U. S. Land & Cotton 2, 23-3-2w, ta 700 ft.

## TENNESSEE

CHESTER COUNTY—Gilmore et al's Scott 1, 10-inch 552 ft, dr 805 ft, Ripley.

DECATUR COUNTY—Chester County O. & G. Co.'s Montgomery 1, arr res, td 2511 ft.

## FLORIDA

DADE COUNTY—East Coast Oil & Nat. Gas Co.'s Warick 1, 12-55s-40e, dr 5280 dolomitic limestone and gypsum; Miami, Fla., Oil Co.'s Chevalier Corp. 1, nw nw 19-54s-35e, elev. 9 ft sr 4570 to reland 6-in cas, td 4600 ft.

LEVY COUNTY — Suwanee Pet. Corp.'s Sholtz 1, nw se 9-15s-13e, elev 34 ft sd 4010 ft.

MANATEE COUNTY—Surprise Oil Co.'s Palmetto 1, 13-34s-17e, sd 852 ft.

PINELLAS COUNTY—Pioneer Oil & Mining Co.'s Yerxa et al 1, 2-29s-16e, co 1151 ft.

WALTON COUNTY—Calumet Co.'s Walton L. & T. Co. 1, se ne 7-1n-17w, dk pat. Oil City Corp.'s Walton L. & T. Co. 1, ne nw 12-1n-19w, cor 4320 ft, green sand and shale.

## MOUNTAIN STATES

### WYOMING

CARBON—Midwest Refining Co.'s U. P. 27, 27-11-81, sd for winter. Prairie O&G Co., Bunker Hill 1, 29-27-87, sd for winter, td 6147 ft.

CONVERSE—John Ackard, se 24-33-72, sd 1820 ft.

CROOK—Northwestern Oil & Natural Gas Co., 6-54-60, sd 1585 ft for winter.

FREMONT—Wiebolt et al, 35-33-99, td 2715 ft. Ward O&G Co., 28-34-90, new location. Yellowstone Oil Co., sw 14-9-94, stand 1000 ft last report.

LINCOLN—Wyo. Prod. Co., 14-24-113, td 1700 ft.

NATRONA—Mutual Oil Synd., Midway 2, sw se 14-35-79, bldg rig. Summit Oil Co., 21-33-80, sd 1387 ft. Wyo. Imperial Oil Co., sw 13-33-79, rig up.

NIOBRARA—Fall River Roy. & Internat'l O&R Co., Joint Globe 1, 2-39-61, sd 600 ft.

SHERIDAN—R. & D. Oil Co., se 21-57-87, sd 1300 ft.

WASHAKIE—Bales Oil Trust, nw 31-48-80, sd for winter at 1100 ft.

WESTON—LeFaivre Oil Synd., se 29-45n-68w, stand 1250 ft. Julius Peters et al, Weitzell 1, se nw 30-46-64, stand 3400 ft, to dr 100 ft deeper. Stockade Anticline Synd., 32-45-60, sd. Gose Oil Synd., Gose 1, 28-47-65, sd 5050 ft.

### MONTANA

CARBON—Corbett Roy. Co., sw se 1-6s-23e, show oil at 1100 ft. Jack Creek O&G Co., 1, se 15-7s-23e, td 1325 ft. Ohio Oil Co., Kutchinski 1, 15-7s-21e, dr 2612 ft.

CARTER—E. T. Moorehead, sw 36-4s-57w, sd.

CASCADE—Buscher & Cassady, Johnson 1, se 19-22-3e, sd td 1387 ft. Charles Merz et al's Sheffels 1, nw 4-21-4e, try for wso., td 885 ft.

FALLON—H. W. MacDonald's 1, sw 28-8n-60e, 8¼-inch cem 1682 ft, co.

FERGUS—Melton Corp., 1, sw 24-21n-17e, dr 3100 ft last report, probably sd. Landheim-Romunstad 2, ne 3-17-20e, set 6⅝-inch at 2116 ft, sd 2600 ft.

GALLATIN—Mont. Gas & Pete Corp., Adams 1, 35-1n-2e, stand 527 ft. Gallatin Valley Oil Co., Haglund 1, sw 13-34-6w, sd 2539 ft.

GLACIER—Fulton Blackfeet Oil Co., ne 28-36-12w, dr 2950 ft.

GOLDEN VALLEY — Golden Valley Oil Co., 28-6n-22, dr 2865 ft.

LIBERTY—Northland O&G Corp., Yurman

1, sw 32-33-5e, dr 3800 ft. California Co., Ross 1, ne 3-33-6e, dr 2610 ft.

MUSSELSHELL—Minn-Flatwillow Pete Co., 1, sw 7-11-31e, to res at 2556 ft.

SWEETGRASS—Shoshone Cons., nw 23-2n-15e, 5500 ft standing.

TETON—California Co.'s Sullivan 1, nw 34-28-7s, sd for winter, td 2810 ft. Earl Oil Corp.'s Gad 1, se 22-22-8w, sd 2850 ft, to res March 1.

TOOLE—Oregon Synd., se 20-36-2e, fsh lost bailer, td 2269 ft. Western Nat'l Gas Co., nw ne 26-37-4e, averaging 15 bbls per day from 1813 ft, to be dr deeper in spring.

YELLOWSTONE—Pan-American Oil Synd., 23-2s-24e, sd 2360 ft. Peter Antonioli, ne ne 21-2n-25e, dr 2450 ft, nearing Dakota.

## NEW MEXICO

BERNALILLO—Norrins Realty Co, Pajarito Grant 1, 29-9n-2e, dr in wash at 1210 ft last report.

CHAVES—Warman Oil Trust, Evans 1, 15-14s-25e, dr 702 ft last report.

DE BACA—Matador Oil Co., Wood 1, ne 6-4n-20e, dr 4670 ft. Landowners Oil Co., State 1, ne 16-1s-27e, co 4685 ft.

DONA ANA—Middle States O&G Co., Boretzi 1, 14-26-5e, spd and sd.

GUADALUPE—N. M. Prod. & Ref. Co., McMillan 1, 24-5n-16e, ur 8¼-inch, td 3875 ft.

LEA—Baker Oil Co., Inc., sw nw 15-13s-33e, mvg in.

LUNA—Angelus O. & M. Co., State 3, se 30-21-10, stand cem, td 6171 ft.

OTERO—Ernest et al's 1, se 20-25s-7e, stand 1445 ft. Pasotero Oil Corp., Evans 1, sw 32-5s-30, rig.

RIO ARRIBA—Berrenger et al's Hartman 1, ne 8-29n-7w, sd 825 ft. Governador Oil Co.'s 1, 15-29-7w, dr 2005 ft, carry 5 3/16-in.

ROOSEVELT—Peterson et al, Good 1, 32-5s-30e, rig up.

SAN JUAN—Kutz Canon O&G Co., Day 1, se 20-28n-10w, sd 3742 ft. Rio Grande Dev. Co., 2, 9-26-11, sd 1771 ft. Continental Oil Co.'s Rattlesnake 24, 1-29-19w, coring 6732 ft. San Juan Leaseholds, Bowman 3, nw 30-30-15, sd 2685 ft. Williams et al., Stallings 1, sw 17-25n-15w, stand 150 ft.

SANTA FE—Jones, Owsley et al, 5-10n-9e, sd 435 ft. N. M. Securities Co., sw 6-10n-7e, sd 480 ft.

SAN MIGUEL—Starr Oil Co., Adams 1, ne 25-17n-16e, fsh pipe 5095 ft. Hershfield Dev. Co., Cabra Springs 1, ne 21-12n-22e, dr 1700 ft.

## COLORADO

ADAMS—Hills Dome Lease Dev. Co., se 27-3s-54w, wait for fuel to res, td 3790 ft.

ARAPAHOE—McDeb Drlg. Co., Fitzsimons 1, ne 7-4s-66w, run 4¾-inch, td 5920 ft.

ARCHULETA—Oil City Pete Co., Fitzhugh 1, sw 34-33n-1e, topped Lakota at 670 ft.

BOULDER—Julius Williams, Degge 1, 6-1n-71, dr bel 1250 ft. Ahlstrand et al, Woodley 1, nw 8-3n-70w, sd 565 ft.

ELBERT—Belmont Oil Co., sw 27-3n-64w, sd 3745 ft. Progressive O. & L. Co., Pease 1, se 27-10s-66, sd 3820 ft.

EL PASO—Gulf States Oil Corp., Carson 2, ne 10-16-66, sd 1126 ft.

GRAND—Oil Mineral Lands, Inc., McElroy 1, sw 14-2-81w, sd 545 ft.

JEFFERSON—Ruby Hill O&G Co., Braden 1, se 34-4s-59w, dr out cem plug, td 4106 ft.

LA PLATA—McGarr Pete Co.'s Pinon Mesa 1, ne 34-33-12, rig up. J. W. Irwin & Co.'s Doescher 1, nw 29-33n-13w, sd 3175 ft. Phipps et al, sw 9-33-13, td 520 ft.

LARIMER—Mayer et al, Reed 1, nw 28-4n-60, ur 6⅝-inch at 2600 ft, td 3100 ft. Natural Gas & Oil Co., Meade 1, se 17-4n-69w, sd 1900 ft. Colo. Prod., Inc., Foster-Motz 1, se se 17-4-69, cem cave, sd 1435 ft. Colo. Prod., Inc., Hoggsett 1, se ne 20-4-60, spd and sd. C. Leonard Smith's State 1, 36-12n-70, prep to res td 760 ft. Poudre River Oil Co., se nw 34-8n-69w, co to res, 1996 ft. Consolidated Drlg. Co., Maxwell 1-A, ne 25-8n-70, to res at 285 ft. Cutler et al, se 4-4n-70, spd.

LINCOLN—Eastern Colo. Oil Corp., State 1, 36-14n-57w, co 60 ft off bottom at 3449 ft.

MOFFAT—Ohio Oil Co., Bogenschultz 1, se 9-6n-91, run cas to test gas at 2781 ft.

MORGAN—Badger Creek O&G Co., sw 2-2-57, stand 1340 ft.

PARK—So. Park O&G Co., Milligan 1, se 13-8s-76w, co 2680 ft. South Park O&G Co., Esche 1, ne 5-9s-76w, sd 2442 ft.

RIO BLANCO—California Co.'s Raven 1, se 20-2n-102, stand cem. 3575 ft.

ROUTT—Mid-Colo. Pete Corp., Omholt 1, se 29-4n-97, sd 1700 ft.

WASHINGTON—Middlemist Oil Co., Middlemist 1, se 14-4-56, sd 1503 ft.

WELD—Retter Oil Co., Smith 1, 14-1n-68w, sd 1385 ft. Conoco, Gadbois 1, sw 24-6n-61w, shot, co, td 6701 ft.

## EAST TEXAS

### Completions

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| HARRISON COUNTY— | | |
| J. M. Gholson's Bivins 1, T. D. Peterson sur ..... | * 3085 | |

HARRISON COUNTY — Ryan Cons. Pet. Corp.'s J. M. Furrh 1, T. J. Copelain sur, rig. J. M. Gholson's Bivins 1, T. D. Peterson sur, dry abn td 3085 ft. Lloyd Oil Corp.'s Jno. Findley sur, 10-in 240 ft sd 4195 ft lime and anhydrites. Gauchee et al's Davidson 1, Richard Starr sur, lcn.

MARION COUNTY—Bauncuach Dev. Co.'s Miller 1, Henry Fulgram sur, top Saratoga 2260 ft top pg 2480 ft sd wo ds td 2800 ft.

PANOLA COUNTY—United Gas Pub. Serv. Co.'s Cadenhead 1, B. C. Jordan sur, rig. Daisy O&G Co.'s Rucks Hrs. 1, Jno. Palmer sur, sd 3264 ft shale. Moses & Wallace's C. L. Daniels 1, Isabel Hanks sur, sd 650 ft. Hoffer et al's Cameron 1, W. A. Lagrone sur, dk. Davidson et al's Latham 1, Wm. Rich sur, 10-in 260 ft base chalk 2095 ft sd 2334 ft. Nelson et al's Williams 1, Jas. Hanks sur, 12½ cas 400 ft sd 3055 ft shale and lime. Stamps et al's Chadwick 1, Wm. Scantleberry sur, rig.

SABINE COUNTY — Rogers & Johnson's Polley 1, Jno. Horton sur, sd 250 ft.

SHELBY COUNTY—E. L. Chapman's Holt 2, Matthew Moore sur, 10-in 103 ft dr 2842 ft (sec. hole). McRobie et al's Windham 1, Wm. Leach sur, (296-ac tract), sd while trying pull parted cas, td 3393 ft. Maulding et al's Frost Lbr. Ind. 1, A. B. Fountain sur, so td 3246 ft. H. H. Gracey's J. A. Morrison 1, Wm. English sur, sd 2600 ft. C. H. Tautenhahn's J. C. Bogard 1, Thos. Baker sur, sd 20 ft partly rigged up. Ridgeway et al's Polley 1, Domingo Gonzales sur, 10-in 112 ft sd wo cas 822 ft. K. H. Francis' Jno. Mims 1, Mary Smith sur sd 3334 ft. Oil News Pub. Co.'s (Simpson & Lewis), Pickering 1, C. H. Patterson sur, (361-ac tract) 10-in 108 ft 8-in 1463 ft td 1495 ft lime. Ray & Dunbar's Hayden 1, D. F. T. Yordt sur, (153-ac tract), rig.

## SOUTH TEXAS

ARANSAS COUNTY—Big Lake Oil Co.'s Giesecke 1, St. Joseph's Island near Aransas Pass, lcn.

ATASCOSA COUNTY — American Central O&G Co.'s McConnell 2, Blk 138, Baker sur, re-dr 1661 ft.

BASTROP COUNTY — Birdwell et al's White 1, Nancy Roberts sur, 4 mi se Belton, sd 540 ft. Humble O&R Co. & Sun Oil Co.'s Powers et al 1-B, Blk 197, 4 mi ne Bastrop, dr 3515 ft. E. R. Marts & Beaven's Wm. Bahm 2, 350 ft e No. 1, J. Standifer sur, spud in.

BEE COUNTY—Buck Oil Corp.'s George Ray 3, nw cor of lease, Jno. Williamson sur, sand 3897-3905 ft, set 6⅝ inch csg 3896 ft, completed 400 bbls. J. M. Davis et al's Geo. Ray 1, 1000 ft sw discovery, Jno. Williamson sur, Pettus (Damac) sand 3952-63 ft, test sw, now dr 4100 ft. Houston Oil Co.'s Portis 4, e offset Portis 3, A. Smalley sur, Pettus (Damac) coring 4123 ft. Humble O&R Co.'s Laura Thompson 1, Garrett Roche sur, sd 5310 ft. Humble O&R Co. & Hulburt et al's J. C. Wood 1, P. T. Irrigation Co. sur, 5 mi se Beeville, originally abn 11-27-30, td 5077 ft, co, made head 47 gravity oil, 6⅝ inch csg set 4949 ft, now sd. Mauldin et al's Fee 1, sw cor 16-a tract, Geo. A. Kerr sur, ru. T. B. Slick Estate, Inc.'s, Geo. A. Ray 4, n offset Portis 3, G. A. Kerr sur, Pettus (Damac) sand 3906-12 ft, set 6⅝ inch 3905 ft, completed 30 bbls, 790 lbs on csg and 780 lbs on tubing; Geo. A. Ray 5, e offset Ray 3, cap 3882-84 ft, sandy shale, 3885 ft, core deeper. The Texas Co.'s L. Gremmel 4, John Pace sur, sw offset No. 3 Pettus (Damac), lcn; Gremmel 5, John Pace sur, sw offset No. 4, lcn.

BEXAR COUNTY—Alamo Nat'l Gas Co.'s W. Gembler 4, A. Menchaca sur No. 51, Eckert, dr 670 ft. Anderson, Ingersoll & Miller's Stenburg, 9 mi sw San Antonio, F. Rolen sur, dr 600 ft. S. W. Blount's S. A. Land & Dev. Co. 1, 1 mi e Medina River on Palo Alto rd, 12 mi s San Antonio, sd 520 ft. Jno. T. Callahan's J. W. McCamley sur, 9 mi w S. A., sd 650 ft. Chiquita Oil Co.'s (Witherspoon) W. H. Cooksey 3, J. W. Rialls sur, Cooksey, lcn; A. Piniazek 1, Martinez & Arocha sur, 1000 ft sw Cooksey pool, set 6⅝ inch csg 1520 ft, top sand abt 1550 ft, td 1669 ft, pump abt 7 bbls; Dan Kesub 2, Rialls sur, 8 mi se San Antonio, dr 650 ft. F. H. Eckert et al's Edwards Heirs 1, Martinez sur, 8 mi se S. A., Gonzales rd, top Austin chalk 1473 ft, td 1505 ft, flow oil through mud, put on valve, temp abn. Eckert & Son's Louis Brehm 1, Eckert pool, lcn; Sandemer 9, Eckert pool, lay water line; Sandemer 10, Eckert pool, lcn; Jno J. Brehm 8, Martinez sur, Eckert pool, sand 662-78 ft, completed 8 bbls. Gatlin Oil Co.'s I. A. Beck 11, J. Montez sur, Eckert pool, mov on. Jones-Volz's F. Bonkowsky 6, dr 600 ft. Ewell Neill's J. M. Watson 1, Martinez sur, 10 mi s San Antonio, show sulphur water 2328 ft, sd. Schneider, Rees et al's Claussen 1, ne San Antonio, S. J. & A. Sur No. 17, sd 1143 ft. W. R. Swearingen et al's J. E. Halbardier 8, Perez sur, Eckert pool, spud in. Van Duyn et al's Bradden 1, 1 mi n Medina river, 8 mi w San Antonio, abn 825 ft. W. K. Oil & Gas Co.'s Strunk 1, Montez sur, Eckert pool, dr 150 ft; Strunk 2, lcn.

BLANCO COUNTY—Hardy Sitton's Standeford 1, sur 155, 3¼ mi sw Blanco City, td 1260 ft. Thomas Hicks et al's Specht & Wiedner 1, Thos. M. Fowler sur No. 27, 2 mi s Twin Sisters, sd 1635 ft.

CALDWELL COUNTY—Joe Bruner's Malone 1, A. Floyd sur, 2 lcns s Salt Flat, sd 2702 ft. T. W. Cole's J. M. Pierce 1, S. Seal sur, n Dunlop 2, Solomon Seal sur, 2¼ mi ne Luling, sd 2503 ft. Rex Kendricks et al's Virgil Carter 1, Isaac Allen sur, 3 mi sw Lytton Spgs., spud in. Meyer Exploration Co.'s Walker 1, Solomon Seal sur, 3 mi w and n of Luling, re-dr 170 ft.

DE WITT COUNTY—C. R. & M. Drlg. Co.'s J. C. Tom 1, A. Lazo sur, A. W. Talk ranch, 1 mi sw Slick pool, coring 4123 ft.

DUVAL COUNTY—Cole Pet. Co.'s Benavides 75, Blk 8, sur 19, Mariano Arispe Grant, Cole-Bruni pool, dr 2400 ft. Duval Oil Co.'s Bishop Cattle Co. 8, sur 135, Gov't Wells field, top sand 2332 ft, set 6⅝ inch csg 2331 ft, dr in. Frank Garvis et al's Schallert 2, Blk 10, Cain & Smith sur 55, Palangana Salt Dome, dr 1720 ft, last rept. Humble O&R Co.'s Paul White 3, sur 58, Gov't wells field, dk. O. W. Killam's Sutherland 1, sur 7, dr 2805 ft; Peters 1, sur 1, dr 970 ft. Mag. Pet. Co.'s Duval County Ranch Co. 1-B, Sec. 96, 1 mi s and 5 mi e S. R. C., dr 2350 ft. S. R. & C. & Mag. Pet. Co.'s Duval Co. Ranch Land 7, S. R. C. pool, dr 1000 ft. Thompson's Parr 1, San Andres Grant, dr 2325 ft.

GOLIAD COUNTY—Benedum and Trees and Plymouth Oil Co.'s Park 1, B. S. & F. Sur. No. 8, 2900 ft se Gibson Parks 1, sand 4543-55 ft, 9 inch cas set 4480 ft, re-cement to 4544 ft, woc. David E. Dunlap's A. T. Fromme 1, P. Dexter sur, lcn. Hoffman & Gooch's Fromme 1, (formerly Rheimenschneider) 10 mi n Goliad, Peter Dexter sur, originally abn 2302 ft, ru to deepen. L. Neal et al's Pettus 1, J. M. Pettus tract, Pedro Trevino sur, w Goliad, dr 4200 ft.

GONZALES COUNTY—Crowder Oil Co.'s Preston 1, W. W. Pace sur, spud in and sd. Johnson-Matlocks O&G Co.'s J. James 1, M. A. Williamson sur, dr 225 ft. Nassamer, Gordon & Waldrop's B. Botts 1, Sec. 6, Blk 56, Gonzales sur, temp abn 765 ft; B. Botts 2, Sec 6, Blk 56, Gonzales sur, dr 500 ft.

GUADALUPE COUNTY—Barnhill et al's Hoffman 1, DeWitt sur, between Seguin and Darst Creek, sd abt 1760 ft. Humble O&R Co.'s Sue Denman 3-C, Wm. C. Arrington sur, Darst Creek, dr 2425 ft in Buda. Luling O&G Co.'s J. D. Brown 1, C. Hall sur, dr 125 ft.

HIDALGO COUNTY—B. H. Adam's (Barrett & Kanellos) J. D. Brock 1, Blk 15, Porcion 79, 15 mi nw Mission coring 2713 ft. La

Joya O&G Co.'s W. L. Hart 1, w part of county, coring 4239 ft. Dayle L. Smith Oil Co.'s Fernandez 5, Porcion 75, 21 m w McAllen, sd 4026 ft; Daskman 3900 ft w Fernandez, dr 760 ft. San Roman Oil Co.'s (W. A. Taylor) Lomax 1, Share 15, dr 490 ft.

JIM HOGG COUNTY—H. D. Conley et al's Holbein 1, Blk 7, Sur. 7, Reuben Holbein Oil lease, sub of Share 3, Las Animas Grant, dr 1345 ft. O. W. Killam's Hinnant 1, Sur 164, Randado field, abn 2245 ft. T. P. Morgan's Fee 1, Share 19, Palo Blanco Grant, dr 2800 ft. United N. & S. Oil Co.'s Gutierrez 1, blk 325, E. M. Doty sub, Charco Redondo Grant, dr abt 2000 ft.

JIM WELLS COUNTY—Gulf Prod. Co.'s Schaeffer 5, sur 89, td 3044 ft, plug to 2427 ft with heavy mud, set 155 ft 4 inch perforated liner on packer, 2272 ft 2½ inch tubing, shut in pressure 900 lbs., work pressure 690 lbs. on ¾ choke, estimated 30,000,000 cu ft gas. Mag. Pet. Co.'s Seelingson 1, Lot 5, blk 11, A. Ramirez sur, 15 mi s Ben Bolt, dr 4000 ft.

KARNES COUNTY—Pickett et al's Lyons 1, spud in.

KENDALL COUNTY—Borgett et al's W. Hagg 1, w Avery sur, sd 1250 ft.

KERR COUNTY—George Ball's F. A. Karger 1, move on. Evans and Gant's Jeff Love 2, Sec 1593, ¼ mi se discovery, dr 5890 ft; Jeff Love 3, J. Martinez Sur No. 1594, 600 ft e Love 1, lcn. Herbert & Halbert's J. D. Will 1, W. H. Hamilton sur, Sec 1923, td 100 ft, prep to deepen.

KLEBERG COUNTY—Joiner et al's (Barbee and Hunter) J. D. Finnegan 1, el Pasidio sur, 7 mi s Kingsville, sd 4007 ft.

LIVE OAK COUNTY—Coastal Oil Finding Co.'s A. M. Handley 1, C. S. Cobb sur, 12 mi sw Beeville, dr 1715 ft. Coquat et al's (Phillips Pet. Co.) Sanger 2, 1280 ft nw No. 1, ru.

MAVERICK COUNTY — I. N. Boicourt's Bandera School Land 2, sd 2284 ft. Texas Gas Utilities Co.'s Chittim 8, Sec 129, blk 7, I&GN sur, Chittim field, sd 4875 ft.

McMULLEN COUNTY—Prince Pet. Co.'s A. Grohman 1, blk 61, Prince Ranch sur, lcn. V. G. Schimmel's F. A. Hale 2, 300 ft n No. 1, sur 63, Two Rivers Ranch sub, sd 300 ft, last rept.

MEDINA COUNTY—C. J. Webster O&G Co.'s (National) Adams 1, Hillemeyer Sur No. 25, near Devine, coring Edwards lime abt 2975 ft.

NUECES COUNTY—John F. Camp & Stanolind O&G Co.'s King 1, Sec. 23, Richard King Farm lots sub, 6 mi n Agua Dulce, ru. Gulf Coast Oil Co.'s Sedwick 2, Saxet field, sand 4550-60 ft, completed 375 bbls 24 gravity oil, 1750 lbs on csg, 1600 lbs on tubing, ¾-in choke.

REFUGIO COUNTY — Blanco Creek Oil Corp.'s Dammann 1, blk 18, Bonnie View Ranch sub, 8 mi s and e Refugio field, sd 4685 ft. G. C. Dixon's P. M. Peck 1, Sec. 24, Bonnie View Ranch, sd 100 ft. Humble O&R Co.'s M. V. O'Conner 2, John Keathing sur, near Victoria line, 933 ft n and 75 degrees w O'Conner 1, dr 1530 ft. E. M. Jones' Josephine Mitchell 1-B, Refugio sur, dr 6000 ft.

SAN PATRICIO COUNTY — Atlantic Oil Co.'s (Welder Oil Co.) Welder 3, 900 ft n No. 2, old gasser 3659-61 ft, to deepen. John F. Camp's Jackson 1, Sec 50, G. H. Paul sur, 3 mi n of Edroy, set 560 ft surface csg, woc.

STARR COUNTY — Coastal O&G Co.'s Kelsey-Bass 1, spud in. Davenport et al's Fee (Wells) 1, C. O. Newman sub, sur 33, El Benadito Grant, dr 1095 ft. H. H. Davis' Kelsey-Bass 2, Sec. 6, Porcion 76, top oil sand 474 ft, set csg, woc. Hooks and Weaver's Kelsey Bass 4, blk 2, sur 6, ru. Jones and Watts & Carter's Kelsey Bass 1, Sur 7, ¾ mi s field, Jurisdiction of Camargo, dr 246 ft. Los Olmos O&G Co.'s Kelsey Bass 9 (10), sur 6, dr 345 ft. Quien Sabe O&G Co.'s W. H. Kusch 2, sur 6, dr 135 ft. San Marcos Drlg. Co.'s Ivey 7, share 8, spud in. Sioux Oil Co.'s (R. E. Johnson) Goodrich 1, tract 5, Por. 81, 1½ mi n Rio Grande City, dr 1225 ft. Stryalls Oil Co.'s M. E. Salinas Por. 80, Share 38-C, dr 600 ft. Ed Sullivan's Kelsey Bass 1, sur 7, dr 310 ft. R. B. Suttles, Guerra 1, Porcion 110, dr 810 ft (last rept). J. A. Tarver's A. R. Bass 1, Sec. 76, blk 7, dr 200 ft. J. A. Turner's A. K. Bass 1, lcn. Jess Williams' Welsh 1, Pedernal Grant, dr 490 ft.

TRAVIS COUNTY—Bass & Fuch's R. A. Chadwich 1, A. C. Caldwell sur, dk. Fritz Fuch's W. M. Schaeffer 1, A. C. Caldwell sur, sd 520 ft. C. R. Franklin's J. Wilson 1, A. Alexander sur, sd 1195 ft. Henze & Ray's J. M. Hatch 1, center Hamilton sur, sd 565 ft.

VICTORIA COUNTY—C. B. Bunte & C. R. & M. Drlg. Co.'s Keeran 2, Keeran field, w of No. 1, ru. Houston Oil Co. & Magnolia Pet. Co.'s Beck 1, ne Victoria, to make lcn. T. B. Slick Estate's McFadden 2, 3500 ft nw 1, J. Barian sur, ru. The Texas Co.'s McFadden 4, 2800 ft n No. 3, ru.

WEBB COUNTY—O. W. Killam's Bruni (Ranchito) 4, J. V. Borrego Grant, ru. Power & Detterheim's Cowan & Goss 1, sur 1606, sd 300 ft. Rosenberg, Johnson & Peacock's Laurel 1, Blk 10, sur 27, Carolina Texas pool, dr 2320 ft. W. R. Shankle & Ellison Fur. & Carpet Co.'s 1, blk 2, sur 466, dk.

WILLIAMSON COUNTY — Burns et al's Wilder 1, R. Owens sur, sd 1496 ft. Hayes and Gee's E. G. Johnson 1, B. C. Low sur, s Georgetown, sd 1595 ft. McLean's et al's Miller 1-A, Manlove sur, sw No. 1, spud in and sd. Peterman et al's Caller 1, 1 mi nw Thrall, dr 1320 ft in Georgetown. R. S. Wilson's J. S. Speckels 1, J. Jordan sur, 1 mi n Coupland, sd 875 ft.

ZAPATA COUNTY—Geo. Ball's Gutierrez 1, Standing 2065 ft, to deepen. Ballard & Mercer's Flores 1, Blk 27, Marks sub, Porcion 37, dr 1648. E. R. Black & Paul S. Williams' Alworth 1, Comitas Grant, lcn. Borgan & Belcher's M. Garza Estate 1, Blk 62, C. A. Douglas sub, Comitas Grant, sand 1680 ft, testing. F. M. Blair & Son's Montemayor 1, blk 1, sur 63, Escobas field, spud in. Eddington & Niles' Trevino 1, Share 34, lcn. F. H. Etheridge's Winch & Henne 3, blk 10, sur 286, coring 1720 ft; Winch & Henne 4, blk 10, sur 286, lcn. O. W. Killam's Medina 4, share 34, Fansler Partition, Comitas Grant, Escobas field, spudded; Medina 5, share 34, Fansler Partition, Comitas Grant, Escobas field, lcn. K. & M. Oil Co.'s Trevino 1, sec 13, blk 7, 2 mi e Escobas field, sand 1498-1508 ft, show gas, dr in. D. M. Shafer's M. Garza Estate 1, C. A. Douglas sub, Zorro ranch, Las Comitas Grant, ru. S. R. C. Oil Co.'s Montemayor 6-D, blk 10, sur 64, s offset Daniels & Hill well, re-cemnt csg 1474 ft, sand 1475-79 ft, sd; Montemayor 8-D, blk 8, sur 64, set 6⅝ inch csg 1469 ft, td 1473 ft, completing. Trevino Oil Co.'s M. Garza Estate 1, blk 36, C. A. Douglas sub, ru; I. G. Trevino 16-A, Sec. 4121, blk 14, ru. Winch and Billings' Jose Bustamante 10, Share 35, Fansler Partition, Comitas Grant, Escobas field, lcn.

ZAVALLA COUNTY — Carpenter et al's Wolf 1, Amos, Beaty and Moulton Block A Survey, sand 731-57 ft, 3 ft break of rock, show gas, set csg 76 ft, woc.

### ABBREVIATIONS

NOTE—The following is the explanation of abbreviations, signs, etc., used in completion and wildcat reports: *—dry hole, abandoned well; ‡—salt water; †—junked and abandoned; ¶—million feet of gas; abn — abandoned; bbls—barrels; b.s.—basic sediment; cas—casing; co—cleaning out; dk—derrick; dr—drilling; fsh—fishing; ft—feet; in.—inches; lcn—location; m—milling; n, s, e, w—north, south, east, west; r—reaming; sd — shut down; sdtr — sidetracking; sp — spudding; sr—straight-reaming; std — standardizing; sw — salt water; td—total depth; ur—underreaming; wo—workover; wosr—waiting on standard rig.


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## LOUISIANA GULF COAST

ACADIA PARISH — Yount-Lee Oil Co.'s Houssiere Latrielle 10, Evangeline, 47-9s-2w, set 5-inch csg at 8640 ft, td 8652 ft. Phillippi Artigus' Valle 1, Evangeline, tested salt water and abn at 1915 ft.

CALCASIEU PARISH — Union Sulphur Co.'s Fee 768, Sulphur Dist., set 12½-inch cas at 1100 ft, dr in rk at 1721 ft; Fee 769, Sulphur Dist., ru. Hill Oil Co.'s W. S. Vincent 1, 25-10s-10w, temp abn at 3270 ft. Shell Pet. Corp.'s Heyd 2, Iowa Dist., dr shale 4920 ft, showing oil at 4905-15 ft. Marrs McLean's Gray 13, Vinton Dist., Sec. 30-10s-12w, dk.

CALCASIEU PARISH — Union Sulphur Co.'s Fee 68, Sulphur Dist., set 12½-inch cas at 1100 ft, dr in rk at 1721 ft; Fee 769, Sulphur Dist., ru. Hill Oil Co.'s W. S. Vincent 1, 25-10s-10w, temp abn at 3270 ft. Shell Pet. Corp.'s Heyd 2, Iowa Dist., dr shale 4920 ft, showing oil at 4905-15 ft. Marrs McLean's Gray 13, Vinton Dist., Sec. 30-10s-12w, dk.

CAMERON PARISH—Brownie Babette Oil Co.'s Black Bayou, 18-12s-12w, ru and stg. Union Sulphur Co.'s Gulf Land Co. Fee, Pure Ls. 1, e Hackberry, 4608 ft in sticky shale and lime; Gulf Ln Co., Humble Ls. 1, dr in sn at 5631 ft, no show. Calcasieu Oil Co.'s Watkins 26, wo, East Hackberry, comp at 3000 ft for 45 bbls; Watkins 31, E. Hackberry, abn in cap rock at 3200 ft. The Texas Co.'s State E. Hackberry 9, lcn 2229 ft n and 918 ft e of sec of 15-12s-10w, but in 12s-9w; State E. Hackberry 10, lcn in 13-12s-9w.

EVANGELINE PARISH—Emile Ledeau et al's J. E. Vidrine 1, 47-3s-2e, ru and sd.

IBERIA PARISH — Warrick Oil Corp.'s Bernard 1, Little Bayou dome, lcn 912 ft n and 150 ft e of swc Sec. 54-12s-7e. Jefferson Lake Oil Co.'s Lake Peigneur 27, Jefferson Lake Dome, comp as sulphur test at 870 ft; Lake Peigner 28, dr 706 ft limestone and calc.

IBERVILLE PARISH—Standard O. Co. of La.'s Myrtle Grove Wilbert 2, Bayou Choctaw dome, dr 1744 ft; Gay 2, Bayou Choctaw, dr 4688 ft; Schwing Wilbert 7, Bayou Blue, 3964 ft in hard sand and rock.

JEFFERSON DAVIS PARISH—Shell Pet. Corp.'s Fontenot 1, Iowa Dist., dr 4113 ft.

LA FOURCHE PARISH—The Texas Co.'s L. L. E. Leesville 4, Leesville, set 10-inch cas at 1034 ft, woc. Pop Oil Co.'s Esponge & Wizer, td 3544 ft, showing oil at 3480 ft. State Prod. Co.'s Dibert-Starck-Brown C. Chacahoula dome, dr sandy shale 1250 ft; Dibert-Starck-Brown D, lcn 1955 ft s 1556 ft w nec Sec. 72-15s-15e.

PLAQUEMINE PARISH — Humble O&R Co.'s Cockrell-Moran 7, Lake Grande Ecaille, flwg 200 bbls.

ST. LANDRY PARISH—W. A. Aggers' S. D. Cochran 1, Sec. 21-6s-5e, ru. Gulf Ref. Co.'s Wilson-Cochran 1, Port Barre, set 6⅝ at 3140 ft, showing oil at 3170-95 ft. Port

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Box 1852, Tulsa, Oklahoma, U. S. A.

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ROOM & BATH $2.50
*New — Fireproof — Convenient*
*Nearest Hotel to Penna. R.R. Terminal*


Barre Oil Co.'s Sibille 1, Port Barre, set 10-inch at 630 ft, dr 712 ft.

TERREBONNE PARISH—Freeport Sulphur Co.'s Wurzlow 1, ru on lcn 1200 ft n and 2660 ft w of sec 8-22s-18e, Bay St. Elaine. The Texas Co.'s State 5, Dog Lake, fndtn; State 6, Dog Lake, lcn; Lake Barre 12, Lake Barre, dr 1721 ft hd li; State Lake Barre 15, Lake Barre, lcn 680 ft s and 1076 ft w of nwc Sec. 30-21s-20e, but in 37-21s-19e; L. L. E. Lake Barre 2, fndtn; L. L. E. Lake Barre 3, lcn. United Gas Pub. Serv. Minor Estate 2, 13 mi nw Houma gas field, dr 4848 ft, sndy shale, no show.

VERMILION PARISH—Pure Oil Co.'s Alliance Tr. Co. 2, Gueydan, dr 2760 ft, broken shale, li shell and sn.

WEST FELICIANA PARISH—Como Oil Co.'s M. B. Woods 2, 54-1s-4w, hauling in dr st., td 2875 ft.

## ▼ PERMITS ▼

(Continued from page 62)

91, 6, 22 TE&L sur, 2316 ft from n and 150 ft from e line. C. C. Williams, Jean, J. B. Foster, 40, 1, 620 TE&L sur, 150 ft from n and e lines. Cooper, Hamilton & Mitchell, Olney, J. P. Dunagan, 68, 3, 163 TE&L sur, 150 ft from n and w lines. Brazleton & Price, Olney, W. S. White, 40, 1, 245 TE&L sur, 150 ft from s and e lines. W. H. Hammon, Wichita Falls, S. R. Jeffery I, 40, 1, 58 TE&L sur, 150 ft from n and w lines. Stastny, Krause, Graham, J. K. Jeffery, 160, 1, 52 TE&L sur, 700 ft from n and 2000 ft from e line. C. O. McCue, Fort Worth, M. F. Wells, 80, 1, 206 TE&L sur, 150 ft from s and e lines. E. P. Bowen, Wichita Falls, F. Clark, 100, 1, 212 TE&L sur, 150 ft from n and 450 ft from w line. P. P. Langford, Jr., Wichita Falls, C. M. Boyd, 80, 1, S 1, BBB&C sur, 1100 ft from n and 300 ft from e line. United Prod. Co., Wichita Falls, J. F. Larimore, 41, 3, 2246 TE&L sur, 150 ft from e and 200 ft from s line.

ZAPATA COUNTY—K. & M. Oil Co., San Antonio, I. Cuellar, 40, 1, S 13, B 7, 150 ft from n and w lines. F. H. Etheridge, San Antonio, Winch & Henne, 40, 3, S 286, B 10, 100 ft from w and 200 ft from s line. Winch & Billings, Laredo, J. Bustamante, 31, 10, No. 35 Comitas sur, 506 ft from ne and 170 ft from se line; J. Bustamante 9, 150 ft from se and 862 ft from sw line. Trevino Oil Corp., Laredo, M. Garza, 40, 1, B 36, Comitas sur, 150 ft from e and 250 ft from s line.

## ▼ LETTERS ▼

Dear Sir:

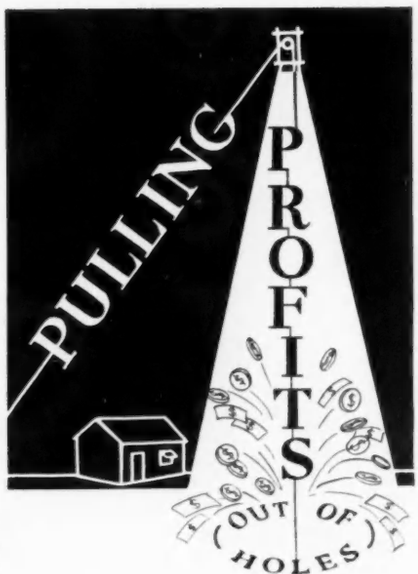
I have read with great interest the last number (February 12) of THE OIL WEEKLY and your editorial.

Why would it not be well to suggest in place of a tax on gasoline, which as you rightly point out, has already been taxed by the states, a tax on natural gas produced, whether used or unused. This would be a great conservation measure, because, if a man had to pay one cent a thousand for gas produced, there would be much more of a tendency to develop along the pipe lines which conduct the gas to market. This would supplement very nicely any tariff on imported oil, because it would serve as a moderate restriction on the production of gas and oil.

I suggested this in my Tulsa address and have not had as many unfavorable comments as I expected.

Yours very truly,

ALFRED C. LANE,
*Geology and Mineralogy, Barnum Museum, Tufts College, Boston Postal Dist. No. 57, Mass.*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**Whether it's "bringing-in" a well or cleaning it out . . .**

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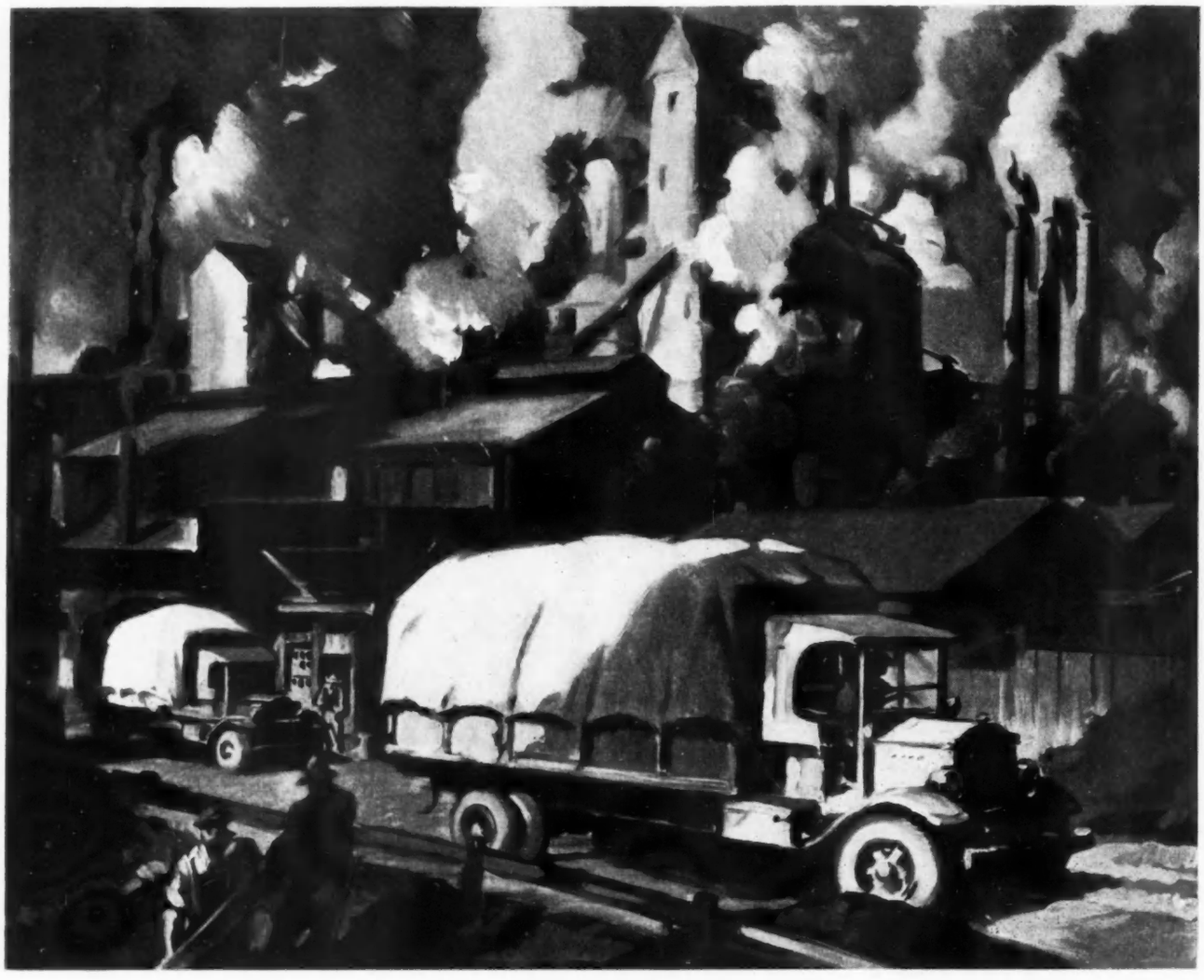


# Transportation

To appreciate the importance of motor trucks in our industrial life, imagine for a moment that by some stroke of an evil genius they have been removed from the streets of the nation. Roads jammed with slow, horse-drawn vehicles . . . small loads . . . reduced operating radius . . . millions lost every year.

The nation depends on motor trucks. These powerful, mobile, flexible tools of distribution penetrate into every nook and corner maintaining the flow of city and country products alike. They bind the smallest hamlet and the largest metropolis into ever-increasing dependence on one another.

Motor trucks depend on gasoline.

Truly then, gasoline is the precious fluid of industry. Obviously, such a precious fluid needs to be conserved . . . and Halliburton, through its oil well cementing developments, is glad to be contributing in no small measure to this conservation. . . Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

**HALLIBURTON**

*Safeguards*

» THE FLUID OF INDUSTRY «

# New Equipment for the Field

## MACHINERY - TOOLS CATALOGS - BOOKS

▼ ▼ ▼

### 1. Tank Equipment

**COLUMBIAN STEEL TANK COMPANY**

Columbian Steel Tank Company, Kansas City, Missouri, announces several new developments for use on oil storage tanks, including a plain thief hatch, a vacuum pressure thief hatch and a vacuum pressure valve device.

The plain thief hatch is non-sparking, vapor tight and corrosion proof under all conditions. The lid raises at four ounce pressure.

*Columbian Tank Fittings*

The Columbian vacuum pressure thief hatch is a compact triple service mechanism, vapor tight and made of corrosion proof and non-sparking material. Its pressure range may be adjusted from four to 16 ounces and the vacuum valve opens at one half-ounce. This item is all metal — no rubber gaskets. The vacuum mechanism is springless, the vacuum valve consisting of a counterbalanced vacuum plate.

The new Columbian vacuum pressure valve device uses Bakelite for the valves and valve seats, not being affected by the corrosive action of sour oil conditions. The valve parts are interchangeable and either valve may be removed from the main housing and adapted individually in any position desired. This valve is built regularly for four-inch pipe connection.

### 2. Adjustable Base

**ROCKWOOD MANUFACTURING COMPANY**

Rockwood Manufacturing Company, 1801 English Avenue, Indianapolis, Indiana, has announced a new base for use in connection with the Rockwood short center drive.

With the new base the manufacturers claim a motor can be made to fit the local requirements of the driven machine exactly, and that the adjustable arms of the base adapt the drive to all motors, old and new, single and polyphase, alternating or direct current, any cycle.

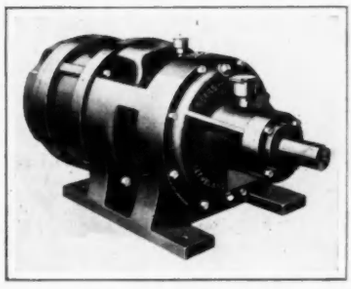
The base permits mounting the motor so that any part of the motor rotating can apply to the driven machine without waste of current or power. Ability to place the weight of the motor so as to control belt tension and the ability to measure the load required of the driven machine tend to minimize wear on the pulley end motor bearing and to increase the life of the belt. The manufacturers claim that with a properly installed drive of the above type the slippage is never over one per cent.

### 3. Motorized Speed Reducer

**GEARS AND FORGINGS, INCORPORATED**

Gears and Forgings, Incorporated, Cleveland, Ohio, announces a speed reducer of the planetary type, built integral with an electric motor, forming a single and compact unit known as a motorized speed reducer.

This self-powered and self-contained type of speed reducer is designed particularly for applications where available space for the driving mechanism is limited.



*Speed Reducer*

The housing of the reduction gears is dust-proof and oil-tight. It is integral with the base which extends to the center line of the motor and also provides rigid support to the gearing and output shaft which carries the load. No additional loads are imposed on the motor shaft, which is supported by two ball bearings.

The planetary type of motorized speed reducers is built in 34 standard ratios ranging from 4:1 to 240:1 inclusive, and in sizes ranging from ¼ horsepower to 30 horsepower.

### 4. Cromaloy Flux

**THE LINDE AIR PRODUCTS CO.**

The Linde Air Products Company, 30 East 42 Street, New York, has developed Cromaloy flux especially for use in welding the chromium-containing alloys more generally known commercially as stainless steels or rustless irons.

Because of the corrosion-resisting properties of these chromium-iron alloys, they are being used more and more extensively, and welded products in constantly increasing variety are being fabricated from these alloys.

A satisfactory flux for use in welding these alloys must

— — — — — — *MAIL COUPON* — — — — — —

THE OIL WEEKLY,
Houston, Texas, U. S. A.

Please see that I am supplied, without obligation, additional information on New Equipment Items Nos._____ described in the March 4, 1932, issue of THE OIL WEEKLY.

*Name* .....

*Company* .....

*Address* .....

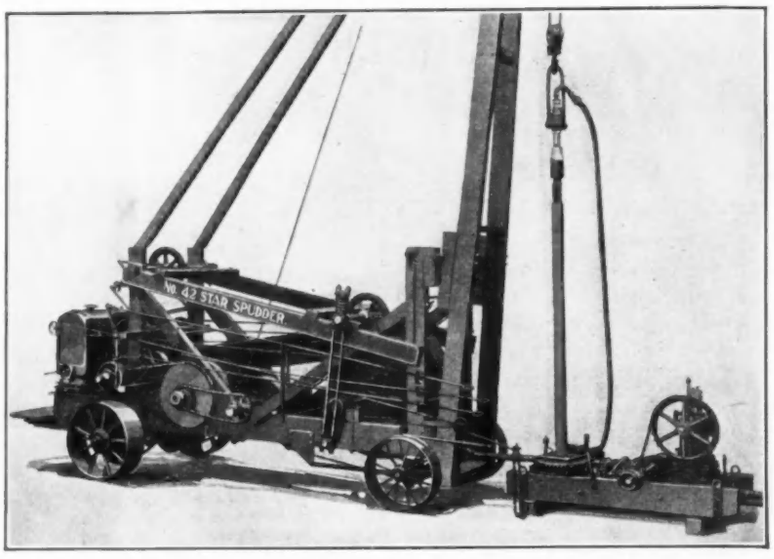
be sufficiently fireproof to protect the molten metal and hot metal adjacent to the weld from oxidation, and at the same time correctly compounded to dissolve the refractory chromium oxide with ease.

Because of its high solvent power for chromium oxide, and its high resistance to heat, Cromaloy flux is especially prepared for this type of work.

## 5. Belt Dressing

**DIAMOND RUBBER COMPANY**

Diamond Rubber Company, Akron, Ohio, announces a new belt dressing called "Griptite" which is not greasy, not inflammable. Features of the dressing claimed by the manufacturer are that it doubles the pulling power of the belt and that its effectiveness increases with use, and that it retains its tackiness for an unusually long time.



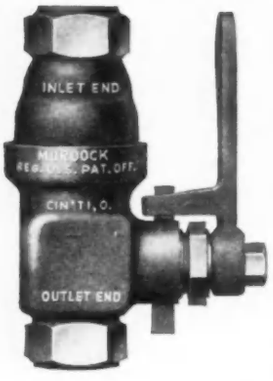

STAR SPUDDER WITH ROTARY ATTACHMENT

*This illustration was erroneously captioned when appearing in connection with a description of this new machine in this section of February 19, 1932*

## 6. Air Valve

**THE MURDOCK MANUFACTURING & SUPPLY COMPANY**

The Murdock Manufacturing & Supply Company, 426 Plum Street, Cincinnati, Ohio, announces a quick opening and closing air valve which it claims is a radical departure from the accepted rules of design. Its principal feature is that it must be opened completely or closed completely, the design being such that it is impossible to obtain a partial aperture.




The valve, called the "Q.O.C." valve, utilizes the cam action principle to eliminate up and down friction at the seat, thus tending to eliminate regrinding. The design of the gland or stuffing box is such that it can be repacked without taking the valve from the line or shutting off the air. Materials of the "Q.O.C." valve are all red brass, except the hard bronze cam shaft and the steel handle.

## Catalogs ◆ Bulletins

**Condensers-Coolers**

**National Radiator Corporation,** Cast Products division, Johnstown, Pennsylvania, has released Catalog CP-2, showing sections it manufactures for condensing vapors, cooling liquids and for general use in the producing and refining branches of the oil industry.

**Pressure Holders**

**Pittsburgh-Des Moines Steel Company,** 3492 Neville Island, Pittsburgh, Pennsylvania, has released for distribution a bulletin titled "Pressure Holders for the Oil and Gas Industry" which describes cylindrical holders, sphere holders, vertical oil storage and gasoline storage tanks.

**Steel Barge**

**American Manganese Steel Company,** Chicago Heights, Illinois, is distributing a bulletin describing a steel barge pump unit which is fitted for carrying heavy materials and might well be adapted to hauling and stationary duties where oil operators are forced to drill in marsh lands or tide lands, such as in coastal Louisiana.

**Steam Turbines—Motors**

**Elliott Company,** Jeannette, Pennsylvania, announces publication of two bulletins: Bulletin H-7, devoted to steam turbine generators, and Bulletin J-4, devoted to commutating pole direct current motors. Both bulletins are illustrated.

**Oiling Devices**

**The Lunkenheimer Company,** Cincinnati, Ohio, has released for distribution a 16-page, illustrated booklet titled "Lunkenheimer Oil Cups and Oiling Devices," the contents of which are indicated in the title.

**Geology of Iberia Parish**

The Bureau of Scientific Research of the Minerals division of the Louisiana Conservation Commission, New Court Building, New Orleans, Louisiana, recently published Geological Bulletin No. 1, devoted to "Geology of Iberia Parish." Copies of the bulletin may be obtained from the above address.

— — — — — — ***MAIL COUPON*** — — — — — —

Company .. .....

Address .. .....

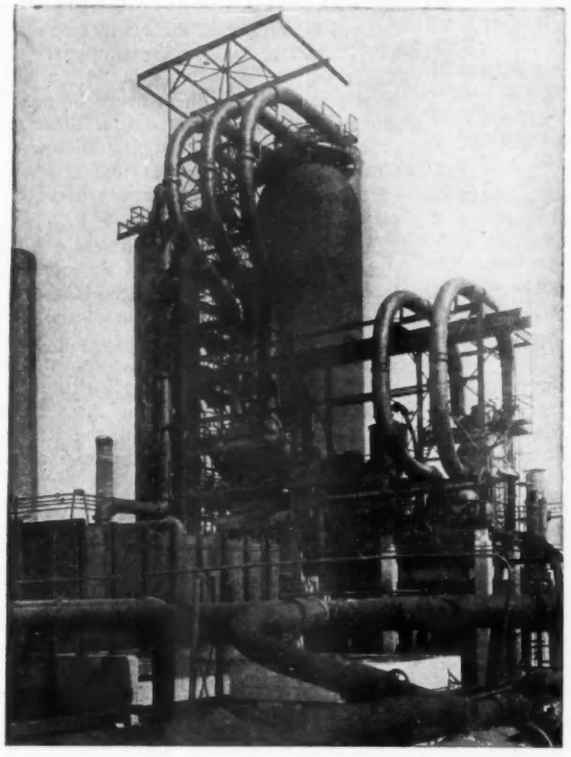
Please send me, without obligation, free booklet described in THE OIL WEEKLY, March 4, 1932.

Name .. .....

Address .. .....

GULF

# Modern Methods Make Modern Gulf Products



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Paraffine and Coastal Crudes

Gasoline · Lubricating Oils

Naphtha · Gas · Oils

Wax · Petroleum Coke

Cylinder · Engine · Cordage

## GULF REFINING COMPANY

*General Sales Offices:* PITTSBURGH, PA.

# NEWS *from the Industry's* EQUIPMENT MAKERS

***Keeping in touch with developments with Manufacturers and Supply Dealers***

**Frick-Reid Supply Corporation** has opened offices at 555 South Flower Street, Los Angeles. Its executive offices are located at Pittsburgh, Pennsylvania, with general offices at Tulsa, Oklahoma. This concern has been a heavy purchaser of California equipment for service in the Mid-Continent and Eastern fields. The company is entering California as distributor of Jones & Laughlin oil country tubular goods, with complete stocks of seamless material at Wilmington harbor. The yard, at this point, was formerly operated by Baash-Ross Tool Company. H. H. Clark, who has been actively engaged in oil field sales work, has become associated with this organization. Mr. Clark was formerly with Baash-Ross Tool Company. R. J. Macon, formerly in the credit department of Frick-Reid Supply Corporation at Tulsa, will be in charge of the Los Angeles office as assistant credit manager.

---

W. A. Tipton now is presenting Wheatley Brothers in the East Texas field making his headquarters at Dallas, Texas. Wheatley Brothers make special equipment for the oil industry including pipe line pumps and maintain manufacturing plants at both Tulsa and Kansas City.

**Webster Engineering Company** of Tulsa announces that C. F. Camp Company has been appointed distributors in Oklahoma, Kansas, North Texas and the Panhandle for Wilgus regulator line of products. The Wilgus equipment is made by Natural Gas Equipment of Los Angeles and Webster are sales agents east of the Rocky Mountains. C. F. Camp has headquarters in Tulsa.

---

**Chaplin-Fulton Manufacturing Company,** Pittsburgh, Pennsylvania, announces appointment of C. H. Collins as representative for C-F regulators in the Kansas City, Missouri, territory. Mr. Collins will maintain offices at 628 Dwight Building, Kansas City.

---

**Barber-Greene Company,** Aurora, Illinois, announces appointment of the Boehck Equipment Company of Milwaukee as Wisconsin representative. Offices and warehouses of the latter organization are located at 2404 West Clybourn Street.

---

**Gulf Coast Machine & Supply Company,** Beaumont, Texas, at its annual meeting of directors held February 11, elected the following officers: E. L. Boykin, president; Dr. L. Cox, vice prejsident; S. O. Campbell, secretary-treasurer and general manager.

*New York office, export division, Oil Well Supply Company.*
*Third row, standing: J. E. Goble, manager, export division; Eugene Tonkay, John A. Read, Jr., A. H. Sherwood (Wilson-Snyder Manufacturing Corporation); G. E. Niver, F. E. Duffee, O. G. Neumann, J. H. McCormick.*
*Second row, sitting: J. H. Elliott, D. C. McWilliams, Miss Christine Stowers, Miss Rose Mendelson, Miss Gertrude Gar, Earl McCormick, Alfred Teleisha, E. H. Bishop.*
*Front row, sitting: Miss Irma Freyer, Miss Elma Anderson, Miss Rose Perillo, Miss Evelyn Svoboda, Miss Claire Simmons (Wilson-Snyder Manufacturing Corporation); Miss Mary Jordan, Miss Eleanor Mikus.*

## Equipment Progress Shown at Exposition

Los Angeles.—The opportunity to show the new developments in equipment which have been perfected during the past year will be taken advantage of by many of the manufacturers at the Third Annual Oil Equipment and Engineering Exposition which will open on March 21 and extend to March 27. Attention to increased efficiency in tools and machinery has been stressed during the past year and many improvements in design have been developed. Men in every branch of the industry are interested in these improvements and are planning to make a study in the construction and operation of the new equipment which will be displayed.

A greater number of technical exhibits than ever will be presented. By means of these, better operating methods will be disclosed and the application of the various types of equipment to field conditions will be indicated. Among these will be the American Petroleum Institute, the California Natural Gasoline Association, the National Safety Council, the Russian government and some of the engineering societies.

Specific technical exhibits will cover the different branches of the industry. One on Diesel engines will show the operation and construction of this type of engine. It will cover all makes and will be educational only. Others will include demonstrations such as lightning arresting, the operation of the turbine drill, dehydration and a number of other general applications of oil equipment.

Many of the exhibits are already in place. Two derricks are erected on the outside space but the drilling equipment will not be moved on to the derrick floors until just before the exposition opens.

Final plans are being completed rapidly and an interesting program will be arranged for each day. The opening ceremonies will be held at 2 p.m., March 21, with Governor Rolph of California officiating. Other speakers will be prominent oil men.

It is the intention of the exposition management to furnish everyone who is connected with the oil industry with complimentary tickets so all the time desired can be spent in studying the equipment on display.

---

**Greenfield Tap & Die Corporation,** Greenfield, Massachusetts, announced in February the election of Charles N. Stoddard as president and general manager of the corporation.

# Squeaks from the Bull Wheel

▼ ▼ ▼

There's a Hollywood extra whose beard is so long that he chages more than the regular "extra" price, $7.50 a day, to work in a scene. He asks, and gets, $15 a day.

But business is slack. So, the other day, when a quickie producer called him up and said: "We need your beard; we'll pay you $7.50; not a cent more," the bearded one accepted.

But when he showed up on the set, his beard was folded in half, and hairpinned up so that it was only half as long as normal.—*New York Morning Telegraph.*

---

It was the day before the annual ball game between the rival village teams. The pastor, and the chairman of the home club, called on the captain, and gave him some money with which to buy a new ball and new bats.

"That may help you to gain a few runs," he told the captain.

The following afternoon, five minutes before the game had been advertised to start, the pastor again approached the captain.

"Did you get the bats and the ball?" he asked.

"No. Bats and balls won't help us," replied the captain. "I gave the money to the umpire."

---

Householder—Even if you are begging, you might be polite when asking.

Beggar—What, trying to teach me my trade?

---

The little boy felt very lonely after his first week at the new boarding school. "Dear Dad," he wrote home, "there are 250 boys here, but I wish there were only 249."

---

Teacher—Just imagine you wanted to buy a nice house costing $5000 and had only $1500; what more would you want?

Pupil—A rich father-in-law.

---

A customer went into a store and picked up an article, walked off with it, telling the clerk to charge it.

"On what account?" called the clerk.

"On account of my not having any money with me."

---

A Kansas City woman was in the dentist's chair. The dentist was using his awful buzzer. She was wondering how much more she could stand, when he hung it up, patted her on the shoulder as he gazed searchingly upon her and said: "Beautiful." The lady was a little taken aback, but said nothing. The dentist turned to wash his hands, then came back to fill the cavities he had dug out at such pain to her. "Yes, sir," he said, smiling down at her. "If I say it myself, those cavities are beautiful."

---

"What's this, honey?" said Mrs. Youngbride's husband as he speared a slab from the dish.

"Lucifer cake, dear."

"I thought you were going to make angel cake."

"I was, but it fell."

---

"I hear old Jim Duffy has had to give up the presidency of his firm on account of disability."

"Yes, his rheumatism was getting so bad he couldn't get his feet up on his desk any more."—*Capper's Weekly.*

---

An old negro went to the office of the commissioner of registration in a Missouri town, and applied for registration papers.

"What is your name?" asked the official.

"George Washington," was the reply.

"Well, George, are you the man who cut down the cherry tree?"

"No, suh, I ain't de man. I ain't done no work for nigh onto a year."

---

"Drink," said the Irish preacher, "is the greatest curse of the country. It makes yer quarrel with yer neighbors. It makes yer shoot at yer landlord; and it makes yer miss him."

---

"Do you ever hear of the $25 Smith borrowed of you last Christmas?"

"I hear of it every day. I have to listen to the radio he bought with the money."

---

Butler (to new cook): "Mind you, I'm not saying anything about your cooking—but there's been a terrible run on cheese and crackers in the dining-room tonight!"

---

"If Minnie in Indian means water, what does Minnesota mean?"

"Aw, don't be dumb all your life, you poor goof—it means sota water."

---

"Thanks very much," said the school teacher, as Tommy offered her some apples, "I will call around and thank your mother for these three nice apples."

"Teacher, please," pleaded little Tommy, "would you mind thanking her for six apples?"

---

"They say you married her because her aunt left her a fortune."

"That's a lie. I'd have married her just the same, whoever had left it to her."


# A Baker Cement Float Collar is Mighty Cheap Insurance on Casing

The cost of a string of casing—long or short—is sufficiently large to make its safety a matter of paramount importance. And it's a lot better to put Baker Cement Floating Equipment on it before you run it than it is to wish you had after the string is "cork-screwed." In short, *fore-sight* is superior to *hind-sight.*

The Baker Cement Float Collar consists of a Baker-Formula Concrete Plug cast and anchored in rounded grooves in a special seamless steel coupling, 20 inches in length. The concrete plug contains the Baker-Designed Bakelite Ball Check Valve.

The strength and safety factors of both the concrete and the Bakelite are so far in excess of even the best casing that Baker Cement Equipment may be entirely disregarded as an element of possible danger. Baker Cement Equipment is mighty cheap insurance.

**BAKER OIL TOOLS, Inc.**

**HUNTINGTON PARK, CALIFORNIA**

COALINGA HOUSTON TULSA NEW YORK

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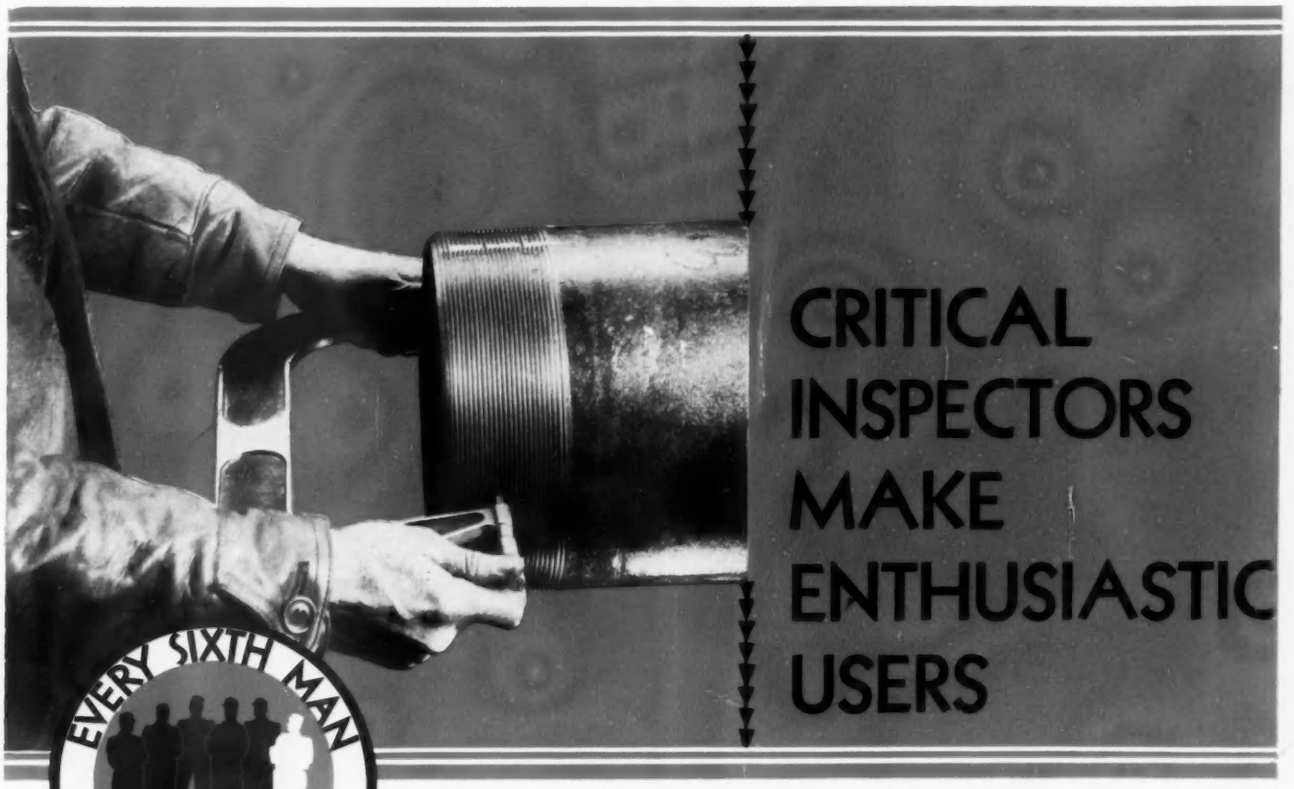

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Critical J & L inspectors make enthusiastic users. They also make the J & L mark on Seamless the stamp of uniform quality, dependable service, and long-time satisfaction.

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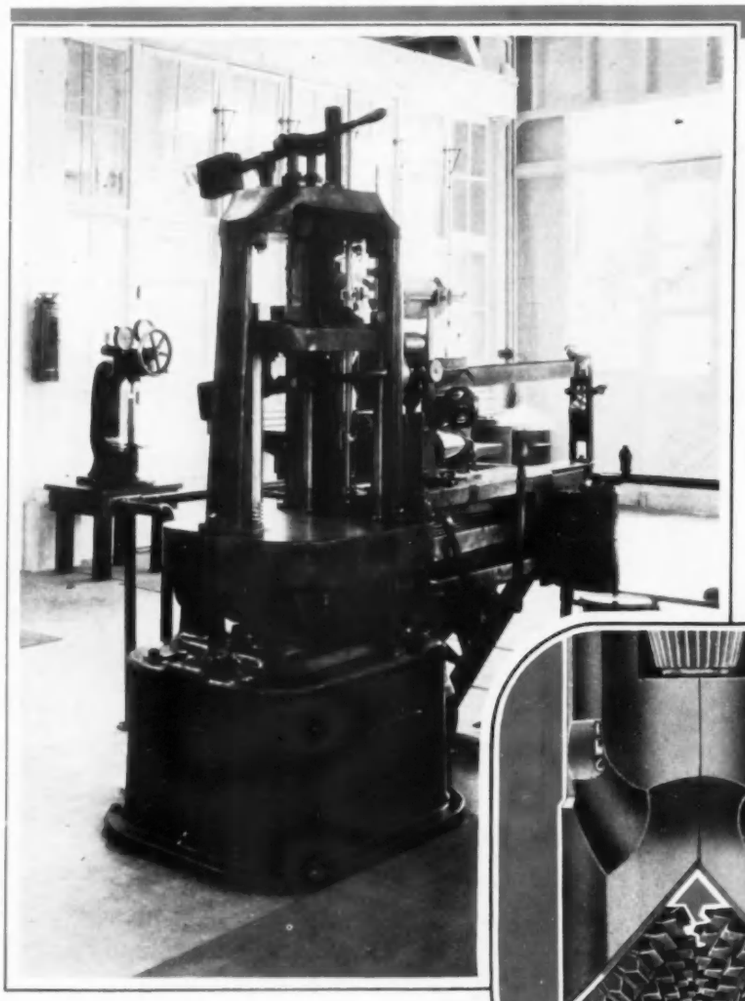
Also makers of Bars, Shapes and Plates, Reinforcing Bars, Cold Finished Steel, Junior Beams, Steel Piling, Fabricated Structural Work, Steel Barges, Wire Products and Tin Mill Products



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*Leaders Thru*
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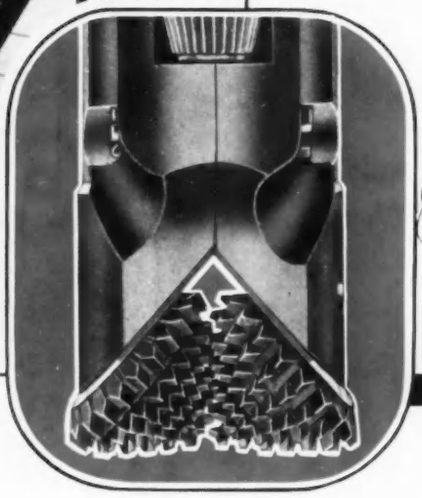

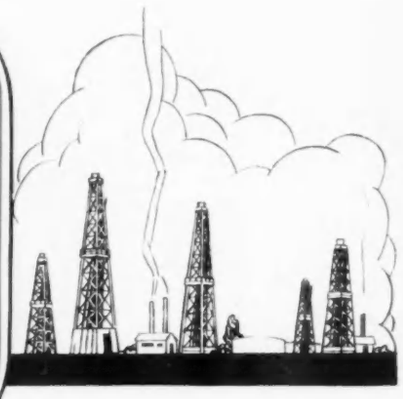

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**The successful operator, contractor and driller knows the importance of the Laboratory in producing tools of superior performing qualities.**

**The Hughes Tool Company has always maintained the Industry's most modern laboratory.**

**No Hughes Tool has ever been offered for sale to the Industry until it had been proven by both field and laboratory tests to be the most economically dependable tool for the purpose for which it was designed.**

***"Sold by Supply Stores Everywhere"***

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